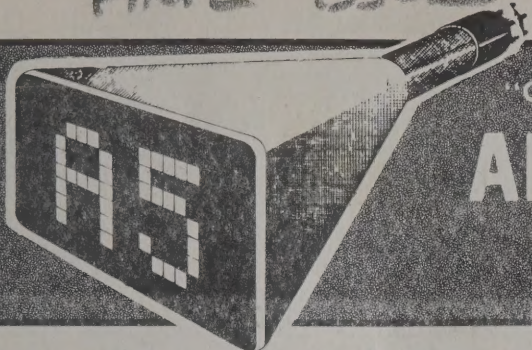


FINPL ISSUE



"OFFICIAL JOURNAL OF THE UNITED STATES ATV SOCIETY"

# AMATEUR TELEVISION MAGAZINE™

FEBRUARY 1985 VOL. 15 NO. 2

PUBLISHED MONTHLY

"OUR 18TH YEAR"

\$2.00

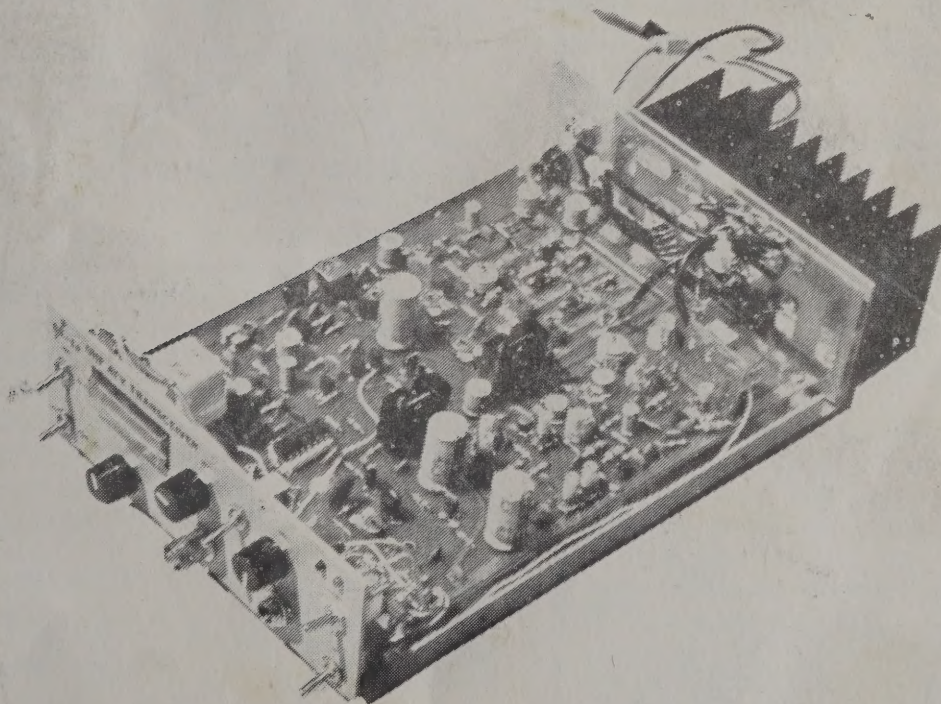
## SPECIAL EFFECTS FOR AMATEUR - TV!

NEW NORTH AMERICAN FSTV HF NET ON 14.245 MHZ. STARTS IN FEBRUARY  
NEW 24 MHZ. SSTV BAND CALLING FREQUENCY RECOMMENDED

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STAY TUNED TO THIS CHANNEL!



Redesigned Silvernail SE1a Single-Board 10 Watt ATV TRANSCEIVER  
by WYMAN RESEARCH, INC., Waldron, Indiana



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of the art



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K.V.G.

### 9 MHz CRYSTAL FILTERS

MODEL	Applica- tion	Band- width	Poles	Price
XF-9A	SSB	2.4 kHz	5	\$53.15
XF-9B	SSB	2.4 kHz	8	72.05
XF-9B-01	LSB	2.4 kHz	8	95.90
XF-9B-02	USB	2.4 kHz	8	95.90
XF-9B-10	SSB	2.4 kHz	10	125.65
XF-9C	AM	3.75 kHz	8	77.40
XF-9D	AM	5.0 kHz	8	77.40
XF-9E	FM	12.0 kHz	8	77.40
XF-9M	CW	500 Hz	4	54.10
XF-9NB	CW	500 Hz	8	95.90
XF-9P	CW	250 Hz	8	131.20
XF910	IF noise	15 kHz	2	17.15

### 10.7 MHz CRYSTAL FILTERS

XF107-A	NBFM	12 kHz	8	\$67.30
XF107-B	NBFM	15 kHz	8	67.30
XF107-C	WBFM	30 kHz	8	67.30
XF107-D	WBFM	36 kHz	8	67.30
XF107-E	Pix/Data	40 kHz	8	67.30
XM107-SO4	FM	14 kHz	4	30.15

Export Inquiries Invited.

Shipping \$3.75

### MICROWAVE MODULES VHF & UHF EQUIPMENTS

Use your existing HF or 2M rig on other VHF or UHF bands.

### LOW NOISE RECEIVE CONVERTERS

1691 MHz	MMk1691-137	\$249.95
1696 MHz GaAsFET	MMk1296-144G	149.95
432/435	MMc432-28(S)	74.95
439-ATV	MMc439-Ch x	84.95
220 MHz	MMc220-28	69.95
144 MHz	MMc144-28	54.95

Options: Low NF (2.0 dB max., 1.25 dB max.), other bands & IF's available

### LINEAR TRANSVERTERS

1296 MHz	1.8 W output, 2M in	MMt1296-144-G	\$299.95
432/435	10 W output, 10M in	MMt432-28(S)	259.95
144 MHz	10 W output, 10M in	MMt144-28	169.95

Other bands & IFs available.

### LINEAR POWER AMPLIFIERS

		Reduced Prices!	
1296 MHz	20 W output	UP1296-20-L	439.95
432/435	100 W output	MML432-100	369.95
	50 W output	MML432-50	199.95
	30 W output	MML432-30-LS	209.95
144 MHz	200 W output	MML144-200-S	374.95
	100 W output	MML144-100-LS	239.95
	50 W output	MML144-50-S	149.95
	30 W output	MML144-30-LS	109.95

All models include VOX T/R switching.

"L" models 1 or 3W drive, others 10W drive.

Shipping: FOB Concord, Mass.

### ANTENNAS

#### 420-450 MHz MULTIBEAMS

28 Element	70/MBM28 12 dBd	<del>\$49.95</del>	\$39.95
48 Element	70/MBM48 15.7 dBd	<del>75.75</del>	59.95
88 Element	70/MBM88 18.5 dBd	<del>105.50</del>	89.95

#### 144-148 MHz J-SLOTS

8 over 8 Hor. pol	D8/2M	12.3 dBd	\$63.40
8 by 8 Vert. pol	D8/2M-vert	12.3 dBd	79.95
10 + 10 Twist	10XY/2M	11.3 dBd	69.95

#### UHF LOOP YAGIS

1250-1350 MHz	29 loops	1296-LY 20 dBi	47.95
1650-1750 MHz	29 loops	1691-LY 20 dBi	57.95

Order Loop-Yagi connector extra:

Type N \$14.95, SMA \$5.95

Send 40¢ (2 stamps) for full details of all your VHF & UHF equipment and KVG crystal product requirements.



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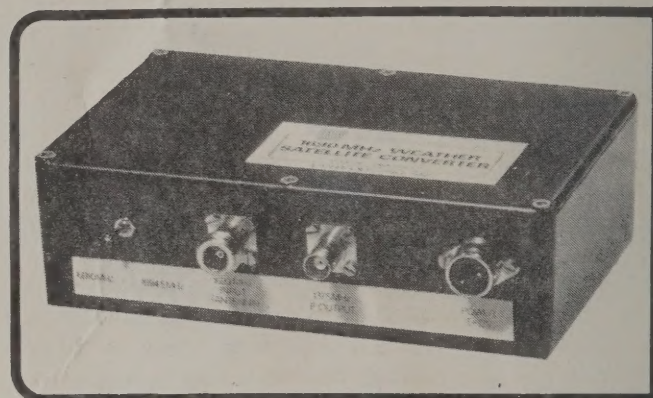
Post Office Box 1084A  
Concord, MA 01742, U.S.A.



MICROWAVE MODULES

"PRESENTS"

## 1690 MHz WEATHER SATELLITE CONVERTER TYPE: MMK 1691/137.5



### "CO-STARRING"

- ★ TROUBLE-FREE RECEPTION OF METEOSAT AND OTHER WEATHER SATELLITES
- ★ DUAL OSCILLATORS FOR RECEPTION OF BOTH CHANNELS
- ★ HIGH SENSITIVITY AND GOOD FILTERING ELIMINATE INTERFERENCE PROBLEMS

Input Frequencies	: 1691 MHz & 1694.5 MHz
Output Frequency	: 137.5 MHz
Typical Gain	: 25 dB
Noise Figure	: 4.8 dB Maximum
Oscillator Frequencies	: 86.3055 MHz & 86.5000 MHz
Input Socket	: 50 Ohm 'N' Type
Output Socket	: 50 Ohm BNC
DC Power Requirements	: 11-13.8V at 100 mA
Power Connector	: 5 pin DIN
Size	: 187x120x53mm (7 <sup>3</sup> / <sub>8</sub> x4 <sup>3</sup> / <sub>4</sub> x2 <sup>1</sup> / <sub>16</sub> "
Weight	: 700 gms (1.5 lbs)

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An "A5/USATVS  
Supporter!





I owe the membership an apology. Our January issue (Vol. 15 #1) was mailed quite late. Some of you here in the midwest got it around the first of January but others on the East & West Coast saw their USATVS Journals arriving about the 2nd or 3rd week. We mailed in late December—the absolute worst time of the year to mail anything, especially 2nd Class, low-priority, Publisher's Rate material. Christmas caught us, and it apparently just got set aside along it's way more than normal. We shall try and mail around the first of December in 1985. Thanks for your patience. Good news. February's issue is here and on time!

I have decided to publish a "QCD Newsletter" every quarter, mailed to about 40 of my closest acquaintances, to keep better in touch with them. The first issue went out last week. In it, I hope to keep you all up to date on the personal situations that happen around here as well as some of the needed issues of the day concerning HAM-TV. The idea came from Tom O'hara's "W6ORGy NOTES". I enjoy reading those every so often and it is a way for Tom to communicate effectively to those whom he wants to keep in touch with. It is just too difficult to try and phone all of you (and costly as well). We have been living without MA BELL'S telephone for a year now—and guess what? Life can go on without one! (We are using an answering service MEMBERSHIP SERVICES number 319 944-7669). It's difficult sometimes, especially late at night when you forgot to tell someone something that needs to be done. At sub-zero temperatures, it is a long walk down to Pat's (our Secretary) at bedtime. Now that things have simmered down a bit on SSTV, perhaps I can now reveal for the first time publically what led to the removal of the phonenumber besides the high costs of so many long-distance calls that kept getting greater and greater. We were being harassed almost nightly for awhile by a couple well known, (mentally-ill in my opinion) HF SSTV'ers. I have always been known as a controversial person in just about anything I get into. I am a "take charge" type of person & speak my mind about the way things should be done even if the truth rubs the toes of those who advertise or should I say "use to advertise with us". You might have noted the lack of advertising by a major SSTV manufacturer that never seemed to have supported the Journal from year's back probably due to the "A5" bad publicity generated by the company's anti-FSTV drive "letter campaign" during the Bruce Brown U.S. FCC days. The phonecalls (we found out) came from Michigan and right here in the State of Iowa. Both calls were verified by a third party (via 2 Meters) calling the

Channel 1

suspected numbers at least a dozen times and getting a busy signal. It is unfortunate that today's SSTV has to be that way. It's no wonder why SSTV has suffered greatly. It's numbers of active operators with all that has happened in the past 3 years. Don Miller, Brooks Kendall and others have been always after me to participate in the Saturday HF SSTV Nets, but my participation would only lead to more controversy. Someone would surely ask "where can they get more information on HAM-TV operations" and the commercialism would begin. There has been too much of that already "on the airwaves" and I am not going to have any part of it. I even have 2nd thoughts in participating strongly in the new NA FSTV NET (see World News Column), but will do so because FSTV'ers are a whole different crowd than SSTV'ers and I realize it is important to keep in touch on HF bands with the UHF group. We will give it a try.

#### IMPORTANT!

Please grab your January 85 issue. On Channel 6 there was a chart for 25 ATV Callsigns with equipment and mode status questions. Please take a few moments and fill out this information on the members of your local UHF ATV gang. All include if your area uses simplex or a repeater or both. Send these to our "A5 MEMBERSHIP SERVICES DEPARTMENT" soon as completed. Some have photocopied these forms and distributed them to members of the local group. I shall compile this information (as in our past year's questionnaires) and report the results in a future issue. This should provide some very interesting information about the part of the hobby. Enjoy this issue and remember, "Spring just around the corner!" -73's WB0QCD

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# Turn a few hours work into years of fun with Amateur Television.

**NEW**

## ATV-2

**\$59.95**

### ATV Converter\*

The new ATV-2 converter has two super sensitive RF Pre-amplifier stages using the low noise MRF-901 (1.7 dB NF) transistors. The ATV-2 tunes from 420-450 MHz and down converts to channels 2, 3, or 4 on your standard TV set. The circuit uses durable microstrip design for stability and simplicity. The combination of a dual RF stage, the microstrip design, and the hot-carrier diode double-balanced mixer reduces UHF TV intermod problems. The local oscillator is varactor controlled for ease of tuning. An additional feature not found on other downconverters is the incorporation of a pre-amplifier stage (6 dB min gain) following the double-balanced mixer. This post amplifier is used to overcome the conversion loss of the mixer. The Post-amplifier also delivers a signal level that is acceptable to the TV set to overcome the TV set's sensitivity threshold. In addition, the Post-amplifier circuitry is most noticeable on every weak signal reception. Overall the Communication Concepts ATV-2 downconverter is just what you need to enjoy amateur television to the fullest extent.

#### ATV CONVERTER:

ATV-2-Wired and Tested.....	\$59.95 each
ATV-2-Pk Partial Kit.....	\$44.95 each
ATV-2-PCB Printed Circuit Bd only.....	\$10.00 each
ATV-2-I Instruction Manual Only.....	\$5.00 each

#### Specifications

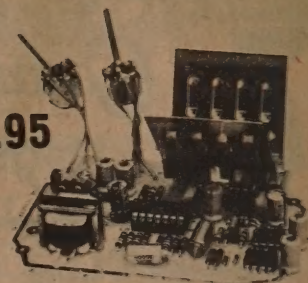
RF Input.....	420-450 MHz
RF Output.....	Channels 2, 3, or 4
DC Input.....	+12 Vdc at 50 ma
RF Stages.....	2 (MRF-901)
LO.....	Varactor Tuned
Fine Tuning Range.....	Approx. 30 MHz
Pre IF Stage Gain.....	6 dB Minimum

### Audio Squelch Control

You have a squelch on your 2 meter equipment; why not add a squelch to your ATV monitor. Now you can avoid the major problem of operating ATV—the annoying hiss and static when the signal is not present. With the ATV squelch, you no longer have to turn the volume down when the signal disappears and risk the chance of missing a signal.

The squelch easily connects to the TV receiver audio stage without modification of the TV, since the squelch circuit contains its own audio output stage. You must provide your own speaker. Operator safety is provided by using transformer isolation between the receiver and the squelch circuit, thus eliminating the shock hazard when using a "hot chassis" type TV receiver.

**\$34.95**



**SIL-K** Complete Kit—includes a detailed instruction manual, printed circuit board and all electrical components. Kit does not include case, speaker and regulated power supply (10 to 15 volts @ 250mA).

**SIL-PCB** Printed circuit board only **\$10.00**

### 100 Watt Linear Amplifier

Now you can get on the air with a high power 100 watt class B linear amplifier for SSB-FM or ATV on the 420 to 450 MHz band and still not spend a lot. This kit is described in Motorola engineering bulletin EB-67 and is available in a number of configurations. For full output, a minimum of 16 watts is required for excitation with an input SWR of not higher than 2:1. Output will maintain stability with a 3:1 collector mismatch at all phase angles. A designed-in low-pass filter suppresses the 2nd harmonic to at least 63 dB down. An external power supply capable of providing 28 VDC, regulated, at 10 amps is also required.

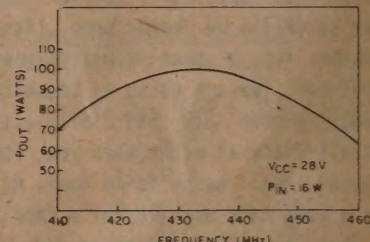
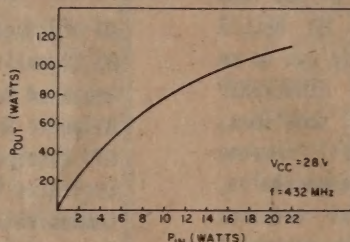


**\$119.95**

**KEB-67-PK** Kit includes detailed step-by-step instructions, printed circuit board, and all electronic components as shown.

**KEB-67-PCB** Printed circuit board only **\$14.00**

**KEB-67-I** Instruction manual only **\$5.00**



## P.C. Boards

The FCC does not allow us to sell Broadband RF amplifier kits in the HF range, therefore we can only offer the printed circuit board and parts on a piece-by-piece basis.

140 watt power amplifier as described in Motorola engineering bulletin EB-63. **EB-63-PCB**

100-180 watt power amplifier as described in Motorola application note, AN-762. **AN-762 PCB**

300 watt power amplifier as described in Motorola engineering bulletin EB-27A. **EB-27A PCB**

Transformers, transistors and other parts are also available.

## We also specialize in hard-to-find components.

In addition to our kits, we also stock parts for other Motorola application notes and engineering bulletins. We have an in-depth stock of Motorola VHF and UHF transistors, Underwood metal clad mica capacitors (Unelco), Kemet chip capacitors, Cambion RF chokes and Ferroxcube Ferrite beads and RF chokes plus other difficult to find parts. If you are having trouble finding a part, call us, we probably have it in stock.

**"WE SUPPORT AMATEUR TELEVISION, USATVS AND A5 MAGAZINE!"**

# Communication Concepts Inc.

2648 North Aragon Ave. • Dayton, Ohio 45420 • (513) 296-1411

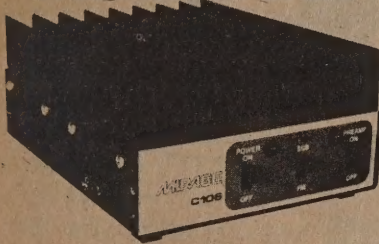




# 2 for 1 Performance from MIRAGE

ATTENTION ALL U.S.A.T.V.S. MEMBERS

**UP YOUR AUDIO AND  
VIDEO-TV SIGNALS WITH  
A MIRAGE AMPLIFIER!**



1-10 Watts Input  
All-mode operation  
5 year warranty

model:

**B1016 (2 meters)**

1W In = 35W Out  
2W In = 90W Out  
10W In = 160W Out  
with RX preamp!

\$279.95

**C106 (220 MHz)**

1W In = 15W Out  
2W In = 30W Out  
10W In = 60W Out  
with RX preamp!

\$199.95

**D1010 (430-450 MHz)**

1W In = 20W Out  
2W In = 45W Out  
10W In = 100W Out  
ATV Model D1010N \$319.95

There's more, and  
WATT/SWR Meters, too!  
See your nearest Dealer

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made in U.S.A.



"THE VOICE OF  
HAM-TV'ERS!"

## "A5" USATVS MAILBOX

"Letters To The Editor"

All letters addressed to this column are kept on file by the Publisher for a period of one year and are available for public inspection by the general membership. Some letters are edited versions for shorter content.

P.O. Box H,  
Lowden, Iowa 52255

(SASE APPRECIATED)

### Crazy Henry Is "going nuts"!

"I visited with WB0CD over the Christmas holidays and during our visit, he showed me his copy of Radio Shack's SANDS OF EGYPT Adventure program for the TRS80C Computer. After a few hours of frustration, we went farther on the journey across the desert than ever before. I got "Hooked", and when I got home, bought a copy of the program myself to play. It became catchy, as some of the personnel at my WJVR-FM Radio Station began trying their hands at it also. We need help from you "A5" COCD nuts! Here is an accounting of how far we went-BUT HOW DO YOU BREAK INTO THE PYRAMID? For sanity's sake, please respond to this request! LiFe will never be the same..." Henry Ruh KB9FO P.O. Box 54 Versailles, IN. 47042

SANDS OF EGYPT ROUTINE: NNNW Shovel; N Kill snake with shovel; EEE canteen; WNNNDWSE fill canteen; get canteen, drink; NNESE get rope; UDWSE tree; drop shovel, climb tree; get dates D get shovel; WSE feed camel; m camel, ride camel; dismount, climb pyramid; get axe, D, feed camel; mount camel, ride camel; dismount, walk tree, cut fronds; get fronds, make rope, bra fronds, WSENNSEUWNN N/S till thirsty, drink, empty canteen, fill cante (oil), get canteen, SEEDWSE feed camel, ride camel, dismount, look carving, look scepter, pull scepter, oil scepter, pull scepter, get canteen, feed camel, mount camel, ride camel, dismount, empty canteen, fill canteen, get canteen, drink; do not eat dates, pool-swim, climb steps, cliff to pool, WSE; oil to cliff, SEE; pool to cliff, NNE; cliff to rope, SE; rope to pool, UDWSE; pool to oil, NNESEUWNN; oil to pool, SEEDWSE; tree to pool, WSE; axe, rope, fill canteen, scepter, shovel, dates, hook hook; to handle; pull hook; unhook hook, get hook; drain pool; walk pool (no swim); HOW DO YOU GET INTO THE PYRAMID?

"ATTENTION ALL MIDWEST AMATEUR-TV OPERATORS!"

## ATV MEETING

ILL/IOWA "QUAD-CITY" ATV GROUP! 439.25 Input  
HORIZONTAL REPEATER 421.25 Output



WA9GVK

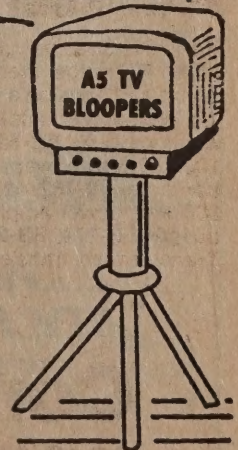
Channel 3

SATURDAY NITE:  
FEBRUARY 23rd  
7 P.M. TO 10 P.M.

HOLIDAY INN I-80/61  
NORTH BRADY STREET  
DAVENPORT, IOWA

IN CONJUNCTION WITH THE  
DAVENPORT, IOWA WOXR  
SUNDAY FEB. 24 HAMFEST

"LIVE" FSTV FROM N9CAI/R  
VCR PROGRAMS  
144.340 MHZ.  
146.28/88 MHZ. Talk-Ins



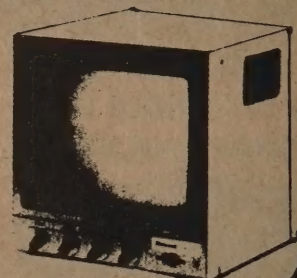


# THE PRICING AND QUALITY YOU'VE BEEN WAITING FOR!!!

## INTRODUCING THE DIAMOND TV CAMERA SYSTEM

• HIGH RELIABILITY • SHARP, CLEAR PICTURES • SLEEK, MODERN HOUSING

IDEALLY SUITED FOR THE FULL RANGE OF INDUSTRIAL, SECURITY, EDUCATIONAL  
AND FARM/RANCH SURVEILLANCE APPLICATIONS. . . and at an affordable price!



Matching Monitech 9" or 12" monitor.

MMV-09..... \$124.00  
MMV-12..... \$154.00

**NEW**

MODEL MS-7001



Sug. List \$160.00  
less lens

Cost (1-3) \$119.50 (less lens)  
(4-9) \$116.00  
(10-up) \$114.00

At last a TV camera that not only performs in a first-class manner and looks great but it's priced LOW for tight budgets! It features solid state circuitry, phase line lock synchronized to the power line, extremely fast AGC (for consistent quality pictures under varying light conditions), sturdy die-case and extruded metal structure for excellent shielding.

The Model MS-7001 is also available in the low voltage 24VAC version at the same price. The number for this version is MS-7001-24. It operates from any standard 24VAC transformer (12 watts min.) or order our transformer No. TX2412 - \$6.00 ea.

C31616 16mm F1.6 fixed iris lens LIST: \$18.25 Cost: \$16.40

Many other lenses available. See our full-line video catalog for pricing.

**HOT LINE DIAL: 402-987-3771**



REQUEST FREE 1985 VIDEO CATALOG  
of TV CAMERAS, MONITORS, LENSES,  
MODULATORS, SCAN CONVERTERS,  
VIDICONS, KITS, MATV/SMATV AMPS,  
FILTERS, MIXERS and much more!!

### SPECIFICATIONS:

Vidicon: 20PE20 2/3" separate mesh,  
electrostatic focus & electromagnetic defl.

Resolution: 600 lines minimum

Scanning System: NTSC (60 hz line freq. 525  
lines/frame)

Interface: Random Interface

Bandwidth: 8 MHz

Amplitude Response: Greater than 50% at  
250 lines.

Sensitivity: (w/F1.4 lens, 75% light reflect.)  
5 Lux (useable scene) 10 Lux (full video)

Signal-To-Noise: better than 40db, (incorporates  
low noise J-FET input amplifier)

Automatic Light Range: 10,000:1

Gray Scale: Min. 10 steps

Video Output: 1.0 V p-p composite video  
(negative sync)

Load Impedance: Standard 75 ohms

Output Connector: Standard UHF SO-239 type

White Clipper: Keeps signal within preset  
level to avoid monitor or VTR overdrive.

Black Clamp: Minimizes monitor readjustment  
with bright highlights.

External Control: Beam, Target, Focus,  
Vidicon positioning (for extreme closeup  
applications), On/Off w/pilot light

Power Consumption (approx): 12 watts on  
120VAC version and 10 watts on 24VAC

Finish: Silver Gray

Dimensions: 229mm length; 110mm width;  
73mm height

Weight w/ lens: 1.6kgs

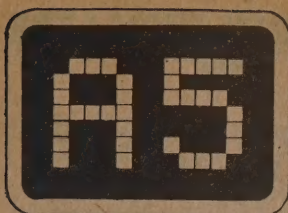
Operational Environment: 10°C to 55°C  
Humidity: 0 to 95% relative

Lens Mount: Standard 'C' mount.

Camera Mount: One (1 4" x 20) hole in base  
One (1 4" x 20) hole in  
cover for top mfg.

1301-5 BROADWAY DAKOTA CITY, NE. 68731





INTERNATIONAL  
**AMATEUR TELEVISION MAGAZINE**  
**News Roundup**

### **"NEW" HF FSTV NET**

Beginning on Sunday morning February 3rd 1985, a "new" NORTH AMERICAN FAST SCAN SCAN TELEVISION NET will commence weekly operations on 14.245 Mhz. This ATV NET is the result of several requests and inquiries by USATVS Members desiring to communicate on HF frequencies with other UHF HAM-TV operators in North America. The NAFSTV NET welcomes active ATV'ers from Mexico, USA and Canada. International overseas ATV'ers are also welcome as band conditions allow. The purpose of the NAFSTV ATV NET is for the exchange of ATV related information concerning activity in various areas of the country, it's problems, standards used, FSTV gear, antennas and other related equipment and interesting projects completed or underway by organized ATV Clubs or Groups. The NET will be supported by members of The United States ATV Society. USATVS Section Managers and Committee personnel are encouraged to "check-in" to these meetings. A special calling at the beginning of the NETS will be conducted for USATVS Officials followed by a general CQ call by the membership. Several NAFSTV NET CONTROL STATIONS have volunteered their stations in helping direct the new HAM-TV network; In the East, Don Fuller W2WHK and Ralph Janousky W2RPO both of New York have consented to alternating NET CONTROL positions, in the Southeast-Hap Griffin WA4UMU and Gerald Croner K4NHN will be present from South Carolina, in the midwest-Mike Stone WB0QCD of Iowa and Everett Onohundro KB0WG of Missouri volunteered and out west-Tom O'hara W6ORG in Southern California, Mike Veldman WD0CTA from Oklahoma will be available. More information on this special FSTV HF NET will follow in future issues of "A5".

### **ILLEGAL ATV Beacon?**

According to WESTLINK's W435 December 28th report, the KU8R ATV BEACON is now operational on 434.000 Mhz. from 8:00 pm. in the Charleston, West Virginia area. The only problem with the well intended KU8R efforts is that beacons remain questionable in legality. This topic was discussed in an article entitled "REMOTE CONTROL ATV" in April 1984 Volume 14 #5 issue. According to the FCC Rules & Regulations and in a telephone conversation between WB0Q and Steve Lett (former FCC Engineer), Amateur Radio "beacon" transmitters are not allowed on commonly worked FSTV frequencies such as 439.250, 434.000, 426.25 or 421.250 Mhz. The use of Amateur Radio beacons falls mainly in the 432 Mhz. SSB area. REMOTE CONTROLLED ATV TRANSMITTERS however, is a different story. If they meet the qualifications as set forth in FCC 97.88, they are permitted. The USATVS is investigating the situation for further clarification as to KU8R's operation.

### **More ATV QRM Reports. . .**

Further UHF ATV band interference has been reported again by KA6GVY. At least a dozen complaints have been filed so far to proper authorities by Southern California ATV'ers. The latest incident involves commercial navigation transponders when on November 28th, two transponders were search out and found by ATV'ers on Catalina Island (possibly on Black Jack Peak) and one on Castro Peak near Malibu. Frequencies of the QRM measured at 432.46 and 438.32 Mhz. This is but of a long list of similar complaints filed previously with the FCC citing violations of Regulations 90.101 and 90.103 having to do with operation of non-Amateur services on a non-interfering basis in the 420-450 Mhz. band.

### **Video Sales Up!**

Consumer purchases of home satellite (TVRO) and VCR video equipment has hit an all time high and record sales in 1984. An estimated 720,000 earth stations now exist in private backyard locations. It is estimated that as many as 35,000 are added each month. In a major move to combat unwanted signal piracy, Programmers such as HBO have begun scrambling their TV signals. Decoders have now been shipped to affiliate Cable-TV receiving stations to decode the scrambled signals which were to be started this February. This scrambling along with a realignment of satellites at closer degree increments has put a hardship of the "pirate" home satellite industry.

### **SSTV Space Shuttle**

NASA gave final approval on the scheduled April launch of the Toney England W00RE 51F Skylab-2 Space Shuttle according to W4RA. The "Challenger" spacecraft is suppose to have onboard Slow-Scan Television (SSTV) relay equipment (ROBOT 1200C modified) for 10 Meter downlink operations. Stay tuned to W1AW and other HF SSTV Nets for further information.

### **New Band For SSTV'ERS!**

The 24 Mhz. band is expected to be open to Amateur operation soon. All modes will be available with specific areas of operation recommended by the ARRL; 24.890 to 24.920 Mhz. for CW, 24.920 to 24.930 Mhz. for RTTY and 24.930 to 24.990 Mhz. for Phone, SSTV & FAX. 24.935 Mhz. is suggested by The USATVS for a SSTV calling/operating area. See details on Channel 35 in this issue.

**"WATCH THIS CHANNEL FOR THE LATEST IN ATV VIDEO NEWS FROM "A5 ATV MAGAZINE!"**  
Channel 5



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## A TV SIGNAL STRENGTH INDICATOR

By Lee Cordell VK5NK

Australian FSTV'ers Lead The Way  
to Better HAM-TV Technology!

(Diagrams shown on Channel 7)

**EDITOR'S PREFACE-** There is alot of ATV experimentation going on "down under". We have a number of "A5" subscribers from Australia and they "renew" regularly. They have perhaps the most sophisticated FSTV Repeater in the world in Adeline, (see Dec. 84 issue). Their "A5" type publication is called "THE ATV'ER" sponsored by the SAATV Group. It's publisher is Ray Foxwell VK5ZEF. "THE ATV'ER" is distributed quarterly and is part of the \$10.00 membership dues. Further membership in the SAATV Group may be obtained from John Ingham VK5KG, 37 Second Avenue, Sefton Park, South Australia-5035. Copies of "THE ATV'ER" may be obtained by sending \$5.00 (U.S. cash or money order) to STEINER ELECTRONICS, P.O. Box 167, Glenside, South Australia-5065.

### TV Signal Strength Indicator

The following two units about to be described were developed for use with an AWA Model C609 CTV, but it should be possible to adapt them to most other makes. Method 1 operates from RF AGC (Fig. 2). R4, R5 and D2 form a logarithmic convertor network. Therefore the circuit is sensitive to weak signals for about 70% of the scale after which it will then read near full scale for a very strong signal. A little juggling of R4 and R5 may be necessary or use a 1K pot, with D2 connected to the centre arm. It may be necessary to adjust RV101 (RF Delay) to get a reading on weak signals, but don't go too far as strong signals will be noisy. Diode D1 provides isolation between Q1 and AGC. No attempt was made to calibrate these units so readings are relative only. CAUTION: Don't stand the meter too close to the TV as this may upset the 'Purity'. Method 2 (Fig. 1) operates from the IF AGC using a 50M1 CROAMP meter and slightly more simple circuitry. A 100K resistor is soldered to R112 (or Pin 9 on IC101) the lead from top of R112 to the PCB has insulated covering, burn off a patch with soldering iron to solder on the 100K resistor R1. To adjust, use as much resistance as possible on RV1 consistent with sufficient sensitivity. Adjust RV2 for about full scale deflection on strongest signal. NOTE: A battery switch is unnecessary as Q1 is cut off when TV is off.

### SIMPLE STAIRCASE GENERATOR

by Grant Wills VK5ZGA

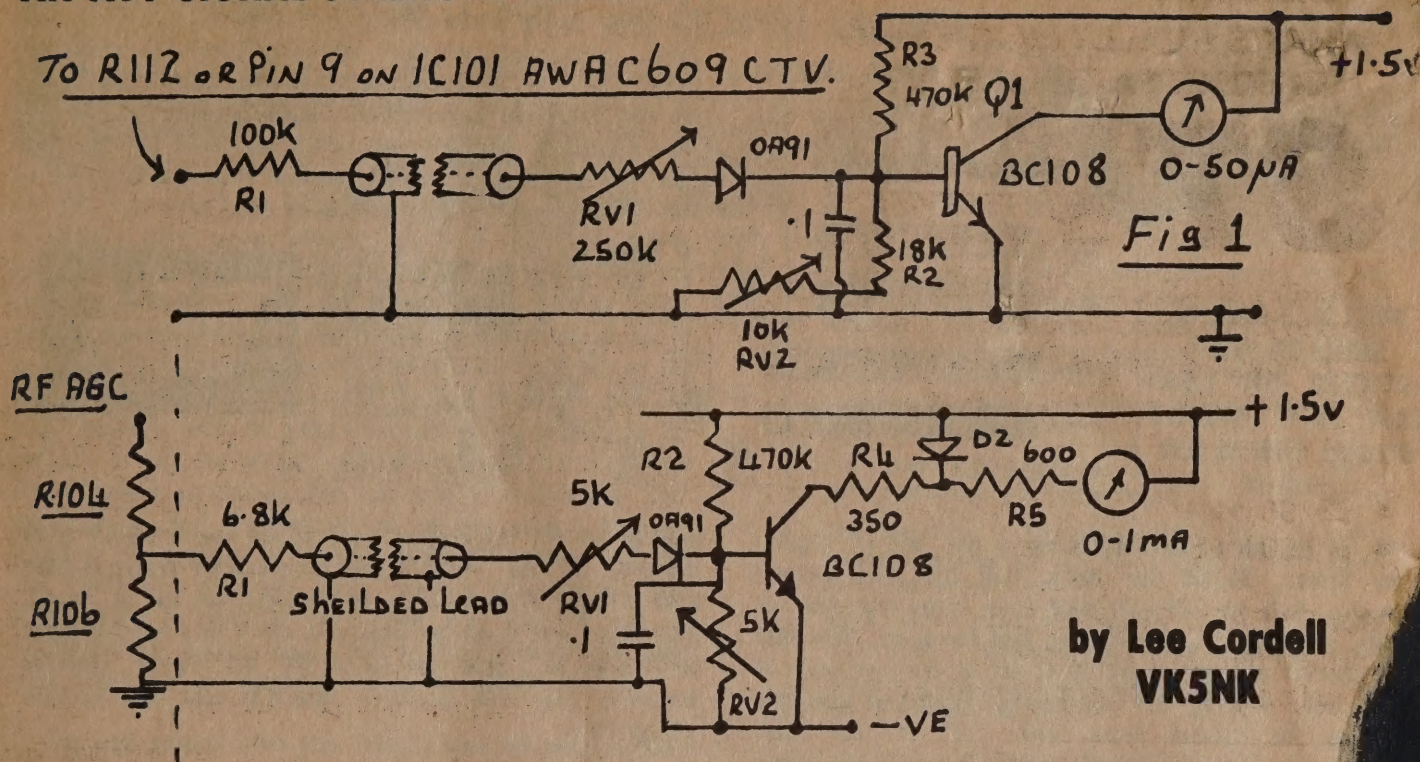
This simple circuit may be of interest to other ATV'ers as it is as a simple pattern generator or as the basis for a more ambitious system perhaps locked to station syncs. The circuit as it stands consists of a free running oscillator composed of gates 1 & 2 which feed a 3 bit counter which in turn drives a simple A/D converter to provide an eight level staircase. SETUP: Adjust 2k2 pot for oscillator output of 8 times line freq. IE 125KHZ.

Channel 6



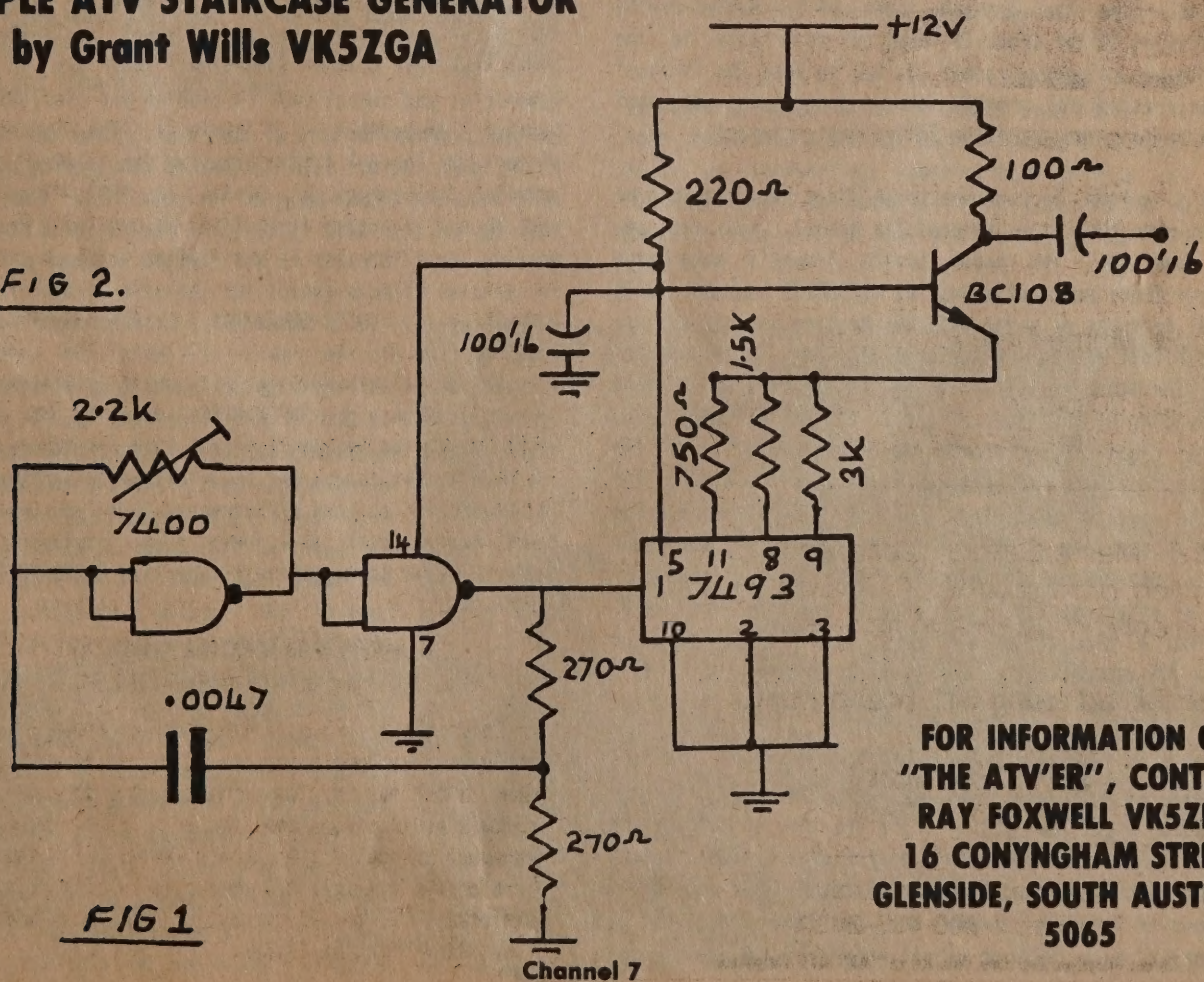
## AN ATV SIGNAL STRENGTH INDICATOR

TO R112 OR PIN 9 ON IC101 HWAC609 CTV.



## A SIMPLE ATV STAIRCASE GENERATOR by Grant Wills VK5ZGA

**FIG 2.**

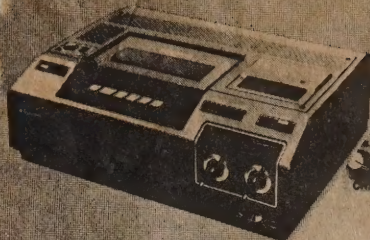


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16 CONYNGHAM STREET,  
GLENSIDE, SOUTH AUSTRALIA  
5065

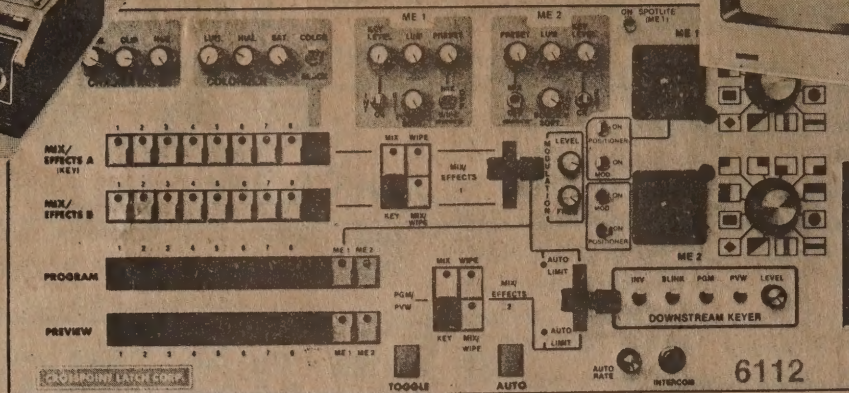


# WHO SAY'S YOU CAN'T AFFORD SPECIAL EFFECTS ON ATV?

HAM RADIO INGENUITY SAVES BIG DOLLARS!



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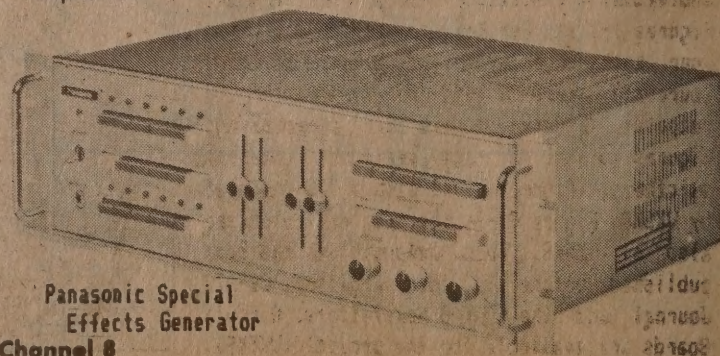
OK, so you don't have \$40,000 for a NTI DSS-11 Digital Video Storer, \$1,695 for B&K's 1260 NTSC Multi-pattern Generator, \$695 for ICM's VC-2000P Color Video Processor or \$95 for Midwest's DPS-103 Time Base Corrector. Does that "special effects" on HAM-TV is out of the question? Of not. Keeping ATV interesting, is what we have been doing for several years now. It is the one, technical hurdle, that in time, can kill off former ham activity. It is so easy to sit there in that comfortable ATV shack chair putting out the same redundant scene night after night. And, let's face it, some of us do not have the groomed looks of Dan Rather or the quality of Walter Cronkite. Most of us relate to the John Belushi category, admit it. So, to keep the "troops" awake, interested and around for a long time, we must generate better, more exciting FSTV video pictures!

Today's prices on consumer grade VCR's have really come down from when they first entered the market. You can now obtain one of the major brands (doesn't make much difference-there are mostly made by MITSUBISHI anyway) with a lot of features of under \$400.00. We have covered VCR use with ATV before and so won't repeat all that it can do for HAM-TV. The major features with an "in the studio" VCR are; 1. the sending of new material and 2. INSTANT REPLAY! Gee, with the right video recorder-we can "playback" just like the big boy's at the super-bowl even with "SLO-MO"! The thrill of seeing your last UHF ATV transmission being replayed is exciting as well as informative as to how your setup is performing technically. And, saving those rare periods of enhancement or long-range DX openings for later replay on a slow winter evening is darn nice to have. The use of a VCR immediately gives you 3 sources of video; Camera, Tape and Commercial TV and a little "built-in" selector switcher to boot.

Speaking of switchers, how come you don't have 3, 4, 5 or more video input switchers? There are a lot of ATV'ers who boast about their 16 video input source switches but use only 1 "audio" input or change a couple plugs. Why not make up an audio special effects system and switcher? Many of us additionally have SSTV or silent video RTTY equipment. How

come we are not interfacing those as ATV source feeds? What happened to the old RTTY days when someone always fed the WIAW RTTY Bulletins at 5 pm. to the group-why not do it on ATV? (It just might get people to watch on a regular basis or it might be a good time for an ATV Net to be centered around?). Even FAX pictures should be sent into the FSTV transmitter.

The addition of a 2nd camera in the ATV Shack greatly enhances the flexibility of a station. Positioned at another angle or directly behind the operator is best. Zoom lenses or motorized "pan and tilt" is the frosting on the cake. If the second camera has "external sync" available, working video special effect generators that use to be in the commercial and educational TV studios are available in the Amateur fleamarkets at hamfests. The Panasonic model pictured on Channel 8, for example, was picked up at the outside flea-market at Dayton in 1983. The price just \$100.00 and it worked first time! Why so low a price for a working unit? Because it was limited to Black and White use for special effects except for the main video feed input. Everything is COLOR these days in the commercial world. A great buy for ATV tho isn't it? With the second camera focused on a black sign with white call letters (or vice versa), you can video SUPERIMPOSE your ID in any corner right over the top of the first camera's input. In fact if you want to get fancy, set up an elaborate background, focus in Camera 2 on your QSL card and there you are-a miniature dwarf, waving back and forth from inbetween your call letters! (Beam me up Scotty!). Who said CHROMAKEYING was too expensive?



Panasonic Special  
Effects Generator  
Channel 8



Cameras themselves today have become real sophisticated. Many models of low-light, color models have their own on-board video faders and color character generators. Some even have timing clocks and date calendar positions. Make your choice in white, black, red, green or blue? The days of external IC PROM ID boards are certainly numbered, but hey-let's don't count them out just yet. If you can't afford to get that \$880 fancy color camera just yet, how about one of W60RG's IDS-1 series boards? They'll do the same thing and you don't even have to bother setting it all up like you do on the camera! Now, let's talk cheap-I mean "real cheap". Can you "borrow" the wife's big mirror while she is sleeping? It is amazing what can be done with mirrors in the ATV shack. Even stick-on call letters pasted in just the right position with the camera focused on you sitting in the reflection of the mirror looks professional. It always has their heads a scratching when they finally realize the "see" the camera that is focused on you the subject. Pre-made signs or "flip-cards" are a must in the ATV shack, and you can certainly show off your creative talent with a good black marker in hand. Our next issue, will show you how to "handmake" a professional looking "teleprompter" for that next "newscast" or "personal station editorial".

The home computer has even found a home not only in Ham's shack but with video output circuitry and be used as another feed for Amateur Television as well. "AS" has listed a number of ATV related graphic programs in past issues-most heavily in the Radio Shack TRS80C, Commodore 64, Apple II and IBM PC Computers. For some, the VCR or home computer may indeed be the first video inputs to the FSTV transmitter long before any camera is purchased.

Whatever the source, the need to keep ATV interesting is very important. And, ATV SPECIAL EFFECTS can do just that! It is easy just "talk" about it in generalized articles like this one, but it's another to actually show "how to go out and build up such a system".

#### Special Effects Generator

On Channels 10 thru 15 of this issue of "The USATVS Journal", we shall take a look at the "homebrew" ATV Special Effects Generator built by South Australian ATV'er and longtime "AS" subscriber Ray Foxwell VK5ZEF. You have been asking for more "technical" articles, so here is one of a series. There are nine (9) individual circuits within the system; Figures 1-2 are for keying your captions into your background video using external sync sources; Figure 3 -is for camera R-6-B outputs; Figure 4 -is for chromakeying; Figures 5-6 & 7 -are vertical interval switchers; Figure 8 -is also a VIS designed by VK5KG; Figure 9 -is the complex colorizer also by VK5KG. This information has been published before in the English CQ-ATV Journal and the SAATV6 Newsletters. Circuit Boards are available for the project (VK5KG).



Channel 9

## Introducing The New DA-4 VIDEO DISTRIBUTION AMP From GRIFFIN ENTERPRISES

Have you ever wanted to feed several devices from one video source? The new DA-4 is designed to be fed with standard 1 volt video from a camera, VTR, TVRO, computer, etc., and provides four individually buffered outputs to drive your monitor, ATV XMTR, scope, VTR, etc. It can be installed into existing equipment or built as a free standing unit. Requires 12-15 vdc.

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You have been writing to for more technical articles and we have been listening to your requests. Turn the page to Channel 10, and you'll see quite an interesting construction article on low-cost "CHROMAKEYING" designed for the advanced ATV builder. How about letting us know what you are doing for ATV "SPECIAL EFFECTS"?



# HOMEBREW "CHROMAKEYING" FOR SPECIAL EFFECTS ON AMATEUR-TV

An Advanced Building Project For The HAM-TV'ER by Ray Foxwell VK5ZEF

Simple Keying is used when captions or computer characters are required to be inserted into existing video, this can be done two ways. First, the information to be inserted into the existing video can be just superimposed. This is done by a standard A/B mixer, the drawbacks of this system is that to get nice sharp captions/characters into your picture usually requires greater than 100% modulation and can cause video buzz and other problems in your transmitted picture, so this system is not recommended. Secondly, the best way to cure this problem is to use a method called keying, and this is the cleanest way to get captions and computer characters etc into your picture. A keyer actually cuts a hole into your picture corresponding to the characters etc of your caption. FIG 1-2 show a couple of methods in which you can key captions etc into your video. In all of the systems and circuits described in this article must be used with cameras that are locked together otherwise synchronizing problems will occur.

## Keying is the "tricky-part" . . .

A system of keying is similar to normal keying but instead of using captions etc you actually use a key, usually of a person, and the outline of the key is the key signal. This method is used mainly in video signals, when you may like to have yourself keyed into the background of a slide or other material. There are two ways of getting the key signal. 1. The key camera is set up on the subject to be keyed against a blue background (red and green can be used) and the signal is fed into a decoder which separates the red, green, blue, components and then fed to a schmitt gate to form the key signal which is fed to the key input of your special effects switcher etc. 2. This method is simpler than the 1st as it does not require a decoder and hence delay problems, but this method requires a camera with R-G-B outputs. Most cameras can be modified for R-G-B output and a simple circuit is shown in FIG 3 and the circuit of the chroma key is in FIG 4. This circuit uses three OP AMPS, two in the inverting mode and one in the non-inverting mode. The outputs are mixed in a pot and the resulting signal is fed to a schmitt gate. This signal is then used as the key signal. Chroma key may be a bit ambitious for some ATVer's but there may be some of you that would like to build up a system like this.

## Expanding the ATV Studio

Over the last few months I have been building a complete studio and have designed a few methods for switching video. Also included are some switching systems (modified slightly) from the British Magazine CQTV. When switching two locked cameras it is desirable to switch them during vertical blanking. Otherwise disturbances can occur and if you are recording the servo of your recorder will have a hiccup at each switch. Switchers that switch out of active picture time are called vertical interval switchers and some methods of achieving this are shown in FIG 5-6-7.

FIG 5 shows a simple but very effective system of vertical interval switching. This is a 10 Channel V.I. switcher originally designed and appeared in CQTV (4 CHNL) by John Goode CQTV 189. I have modified it to give 10 channels and have also removed the priority switch on IC. Boards are available for the switcher unit and also for the 10 switches. I used shadow PC mount switches mounted in a priority method eg 10 overrides 9 overrides 8 etc. FIG. 6 is one I designed for the studio and works well. This uses a 74LS374 OCTAL D type flip flops a complete circuit is shown in FIG. 7. FIG. 8 is a vertical interval switcher designed by John Ingham VK5KB and also works well. It is a bit more complex but has the ability to be remote from the main switcher.

## Going Color!

In FIG 9 there is a circuit of a colorizer (Cox Box). This unit was also designed by John Ingham VK5KB some years ago and WAS published in an earlier "ATVer". Due to its popularity, I have reprinted this unit again. Again this unit is mainly for the advanced amateur and requires a colour incoder for this unit to run into. I have only drawn the connections to IC5, IC6 and IC7 are identical as drawn for IC5. There are 9 colorizer pots and 3 other pots. 1 for over all gain and 2 for white and black clip levels. These are all panel mounted. With these 9 pots any combinations of colours can be achieved. Best results will be obtained if a B/W camera is used as the key camera and also must be locked to station syncs.

## Interconnections

Connect B/W camera and neg blanking to unit connect R-G-B outputs to incoder and switch on. The best results are made if a special test pattern is used (to make test pattern use 3 strips of 3 inch wide by 6 ins long paper or cardboard. 1 strip grey, 1 strip white and 1 strip black. As shown in FIG 10, mount 3 strips along side each other and glue to backing board.) Point camera and focus on test pattern. Completely fill screen with test pattern (use separate monitor for camera). With the aid of a cro, fit pro to TP1. First adjust VR1 for max. linear gain after sync is stripped off see FIG 10A. Secondly adjust VR2 so that the clamp pulse sits on the back porch (not critical). This is best carried out with a dual beam cro. 1 probe on TP1 and 2nd probe on input video repeat several times. First set VR3/4/5 to mid position. Also set all 9 colorizer pots anti-clockwise position. Then turn grey pot on green bank fully clockwise. Turn black pot on blue bank fully clockwise. And white pot on red bank also fully clockwise. This sets up output for R-G-B equal levels. With the aid of VR3 and VR4, white clip/black clip and master gain adjust these until you have a reproduction of the test pattern except where it was black, white, grey. It should



be now in full colour of red, green and blue. Adjustments of these controls at first may be a little tricky. Adjust white clip/black clip and also black/white presets so as to have a smooth transition of clipping level with the two white/black clip panel mount controls. Once you have been able to reproduce the test pattern in its correct colours you can now use any material for your Key camera. Well, thats all for this issue. In the next issue I will have some other units to build including a colour encoder for use with digital signals using the TEA 1002 encoder IC.

### Additional Notes (Channel 14)

The circuit in FIG 1 was originally designed for HOT CHASSI TV SETS (Monitor Modifications). Its use can be varied for your own applications. The 6N135 Optocoupler is a Hewlet Packard High Speed Optocoupler and with some small modifications can be used to pass wide band video with a great deal of success. The specifications state that it is flat to about 2MHz and is about 10DB down at 10 MHz. The device HCPL2530 is rated at about 3MHz but replacing this device in lieu of the 6N135 very little difference was noted. In the light of the cost of the latter device, the 6N135 was finally decided on and this unit is designed around this device. The circuit in Fig 1 is as it looks, very simple. T1 is a linear amplifier designed to drive the LED in the OPTO COUPLER. The POT in the base circuit is mainly to give a bit of sync stretch and is adjusted with ADUAL BEAM CRO to give identical signals on the input and output. T1 has some HG lift in the emitter. This is used only if colour is to be passed as the circuit needs this lift around SUBCARRIER FREQUENCY. T2 is a simple emitter follower to drive into 75 OHMS. This circuit could be replaced with a more sophisticated design incorporating a Black level clamp. This would improve the low frequency tilt experienced with this circuit. The design as it stands could be improved on quite a bit. But as it stands works well. Let me know if you do some improvements on the unit and I will publish the results. -VK52EF

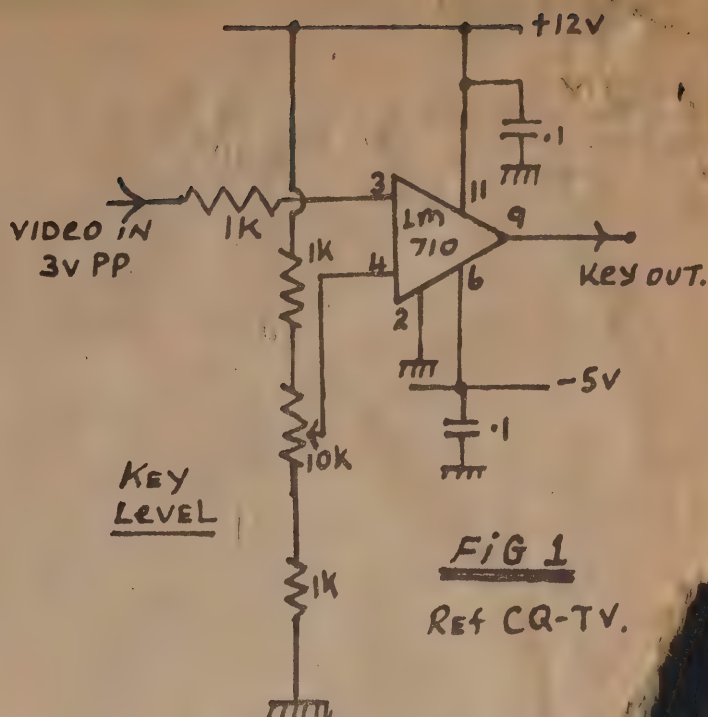


FIG 1  
Ref CQ-TV.

Most cameras can be modified for R-G-B output simple circuit is shown in Fig. 3 and the circuit Chroma Key is in Fig. 4. This circuit uses three OP Two in the inverting mode and one in the non-inverting. The outputs are mixed in a pot and the resulting signal fed to a Schmitt Gate. This signal is then used as the Key signal. Chroma Key may be a bit ambitious for some ATV'ers, but there may be some of you that would like to build up a system like this.

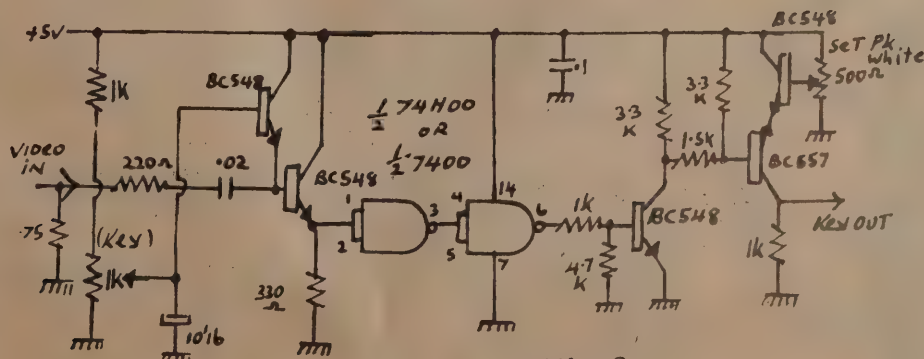
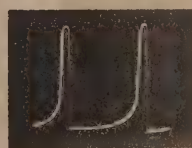
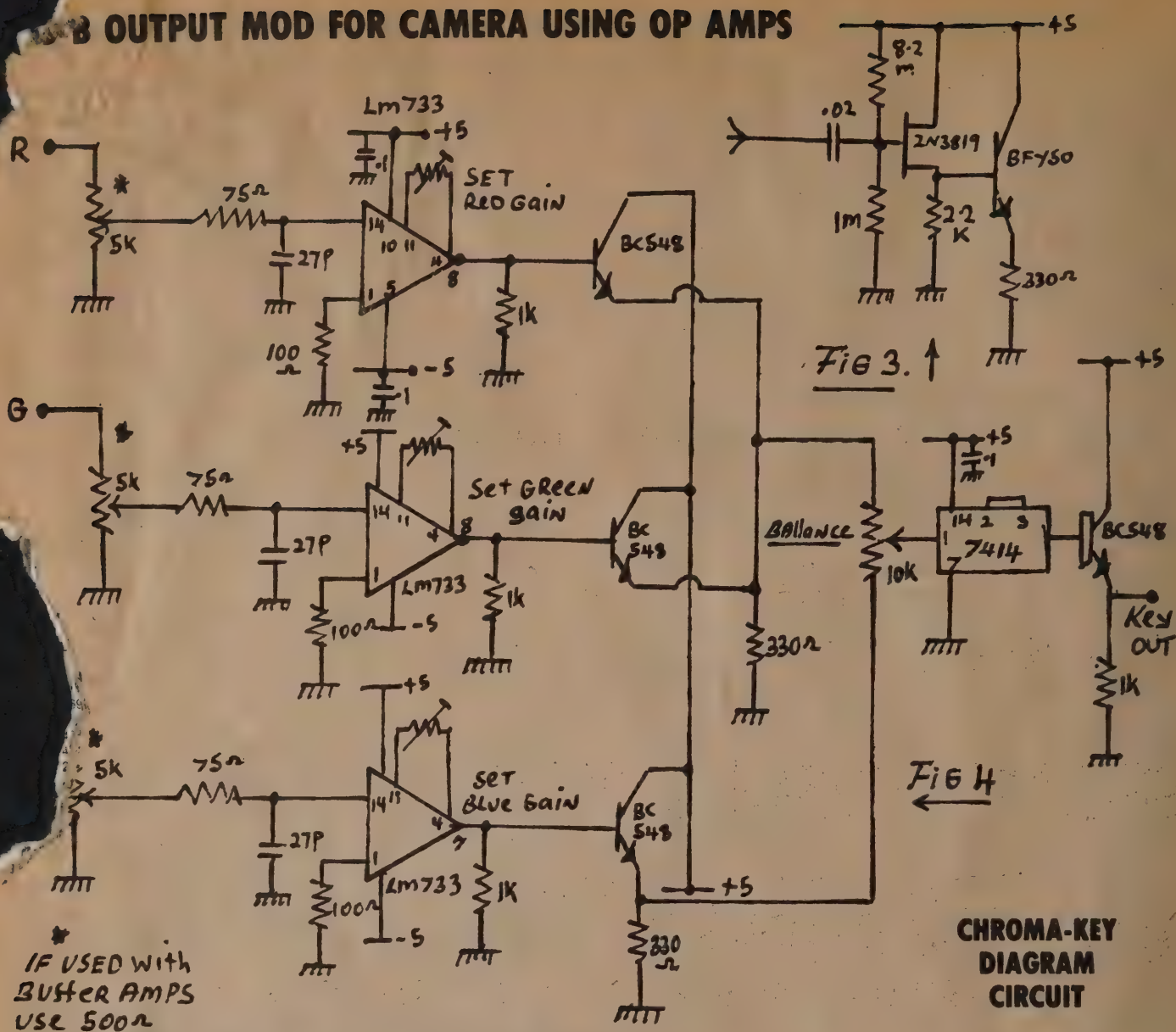


FIG 2.

Ref CQ-TV.



# B OUTPUT MOD FOR CAMERA USING OP AMPS



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Our "specialty" books like "EVERYTHING YOU ALWAYS WANTED TO KNOW ABOUT ATV" but were afraid to ask" and "ATV HANDBOOK" are great reference manuals for today's ATV'er. Our "A5 MEMBERSHIP SERVICES" Department has been servicing the needs of HAM-TV'ers since 1967-over 18 years! Thanks for your support and we hope that you help spread the word...

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## CH FOR THE HORIZONTAL "OMNI" REPEATER ANTENNA WITH GAIN

In our previous issue, we reported what the Iowa "ILL/IOWA ATV Group" was doing toward their HORIZONTALLY POLARIZED FSTV Repeater project "N9CAI/R" in Davenport, Iowa (Quad-Cities). The use of six (6) KLM-440 UHF 420-470 Mhz. Six element Yagis antennas with interconnecting phasing harnesses, splitters & matching baluns in a semi-omnidirectional pattern was demonstrated in detail. The concept and experimentation tests however, left two quite noticeable side lobes as shown in the dotted line graphic illustration. It was later decided, that if the project had gone this far with six antennas, it might as well go the whole route with eight antennas attempting a better omni-directional RF radiation pattern. Two additional antennas and another 4-way splitter were ordered and installed in late December 1984.

The theory behind the keeping of the "HORIZONTAL MODE" of antenna polarization, while building an ATV Repeater system, is a lot of good sense. Not doing so, means the erection of a 2nd set of antennas, hardline runs, another preamp, or abandonment of the "H" mode all together, causing nothing "outside the area" polarization standardization during band enhancement or DX openings, more very expensive and up to months or years of time lost for each user not to mention the activity hard feelings and division that will certainly follow along the ATV community. Looking back at areas that took the apparent easier "VERTICAL POLARIZATION" due to the suggestions of staunch vertically polarized users (no matter what the expense or loss to activity), is very questionable in the long run -as the ATV Repeater project that was suppose to "aid the growth of Ham-TV activity", in fact (if the truth were admitted), caused the mode to suffer greatly. Such an example of this unfortunate situation is now unfolding in South Carolina. ATV activity flourished with excited pioneering efforts between 1982-1984. Then, a new group of unaware (or ignoring) newcomers came on the band putting up an ATV Repeater within this same area (Columbia) and largely due to the suggestion of a West Coast Dealer in ATV gear, elected to go with the "VERTICAL POLARIZED" signal route. The result is now "complete chaos" among area users. The old group is falling apart with a couple of the original "leaders" vowing to look into SSTV (you know things must be bad) or 432 Mhz. SSB. ATV gear is "up for sale". It is just a question of time before ATV activity begins to die out. A once healthy, new ATV area is now in danger of extinction - all for a an ill-advised \$35.00 ground plane. Doesn't make too much sense, does it?

We are not trying to debate the question of which mode of ATV RF antenna polarization is best, in fact-it really doesn't make any difference at all. If your area (200-300 mile radius) doesn't have any standard-go VERTICAL. But, if your area already uses the HORIZONTAL mode, try and stay with it for an ATV Repeater project. It is this concept that inspired the thinking that began a 2-year experimentation process with the "ILL/IOWA ATV Group". Their "successful" results, perhaps may be of a needed incentive for other ATV groups now facing the same dilemma?

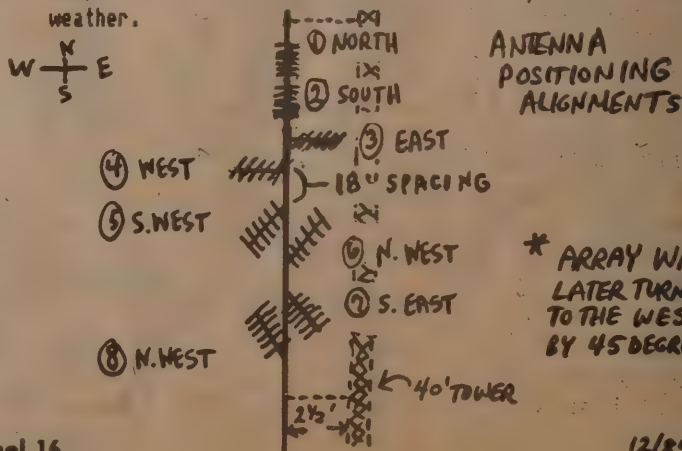
### PART TWO REPORT

USING 8  
KLM-440  
BEAM  
ANTENNAS



LIVE VIDEO PICTURE GENERATED

TEST#1-consisted of the N-NE-E-SE-S-SW-W-NW spiral pattern placement of antennas (tried unsuccessfully on previous tests including the 1983 Cushcraft J-Pole tests). IMPORTANT-The phasing harness fed all splitters in a conventional manner. That is to say, using the bottom of the splitter as the input feed source. Results on N9AEP (10 miles) from atop the highly elevated St. Ambrose College location were a basically dead system with only antenna #2 and 8 showing sync bars or a weak P1 signal. TEST#2-Fed the top 4 antennas only with a 4 way splitter (mainly to check to see if there were any problems with any antennas). Results; Antenna 1 (top) P4, antenna 2 P4, antenna 3 P5 and antenna 4 (bottom) P3 plus. TEST#3-Bottom four antennas. Results; Antenna 5 P4, antenna 6 P3, antenna 7 P3 plus and antenna 8 P-Zero (?). TEST#3-N9AEP changed the phasing harnesses to feed every other antenna instead as routed earlier. Results; Antennas 1&2-Sync Bars, antennas 4&5-weak P1's, all others showing P Zeros. TEST#4 & #5-W80QCD returned the placement of antenna directions to the rotation pattern that worked best for the 6 antenna tests, that is N-S-E-W-NE-SW-NW-SE (see diagram). IMPORTANT-returned using convention phasing harness feed. Results; Antenna 1-P2.5-3, 2-sync bars, 3-P2, 4-P Zero, 5-P1, 6-P2, 7-P Zero and 8-P Zero. TEST#6-(PHASING HARNESSES CHANGED AND ROUTED IN AS SHOWN IN DIAGRAM), Results; Antenna 1 P-4.5, antenna 2 P-2.5-3, antenna 3 P-3, antenna 4 P-3, antenna 5 P-2.5, antenna 6 P4, antenna 7 P3 and antenna 8 P-2.5! THEY CAME ALIVE AND WORKING! Other tests were conducted at various locations from the rooftop. Placement of the antennas was not critical except near base of tower. The system had to be temporarily secured near the tower however, due to winds and weather.





The system was left for about a week (at reduced rooftop level) fed by the main piece of good 7/8 inch hardline but with approximately 75 feet of added BELDEN 8214. It was anticipated that the 30 foot lower height and extra lossy cable would most likely reduce previous signal reports by other users. Reports that week were; WA9SBW-Picture got much stronger, can now key up on 2 Meters and do not completely blank out the TV set! N9AEP-greatly reduced P2 to P3 signal readings-no color, W9DNT-Really dropped here, W9VSR-down a bit but still P4 with color, WB9WST-better than previously, can see more detail, K0MST-up now, can read the small letters on the computer bulletin board now, WB0ETC-about the same zero to P1, WB0QCD-about the same as before P2 to 2.5, KA0BVT-weak to strong sync bars, way down from old turnstile system. The early (rooftop) reports were encouraging. It was felt that the 30 foot height loss and maybe the lossy coax affected N9AEP and W9DNT the most as they were indeed located behind a rolling bluff ridge at comparatively low elevation height. WB9WST's reports have been erratic and unreliable in the past and W9VSR only 5 miles away was considered to be a more reliable picture of what was actually taking place. WA9SBW & K0MST actually saw improved signal quality and WB0QCD surprisingly saw about the same pictures (30 miles away) which meant that the system was beating out former arrays (at least in their directions). TEST#7-WD0AMA and K9FYV conducted further tests a few days later including the sending of a single KLM-440 antenna fed (7.3 dBd gain measured) signal rotated and peaked to each user. Results were a significant one P-unit better picture than with the split 8 antenna system. This was not surprising, due to the addition of nearly 20 Type-N connectors, phasing harness, splitter and balun losses. It was an interesting reference test and would perhaps give some sort of eventual idea as to real gain emitting from the array system.

#### But Would It Work?

There were mixed feelings among the local ATV group as to just how the experimental system would work once back "in the air". Some wanted to see it tried, others didn't think that it would work as good as the 2 year SEMCON turnstile system. It might be noted, that is was interesting as well as frustrating, to all of the sudden see "the armchair experts" come out of the woodwork with their antenna theory suggestions and comments. Since the entire antenna project had been developed and funded by WB0QCD (at no immediate expense to the Group-win or lose), it was decided to put the array "in the air" for final testing. TEST#8-On December 9th after nearly 7 hours, WD0AMA and WB0QCD erected the array on 40 foot tower side arms at the St. Ambrose College, Galvin Fine Arts/Communications Center building. Of course, everything was tightened, checked, taped and weatherproofed. That evening, the first early reports came in on the N9CAI/R REMOTE TRANSMIT MODE at approximately 8-10 watts to the antenna; K0MST (10 miles)-Strong P4 signals with color! with plenty of FM audio subcarrier; W9DNT (5 miles), P-4 "best I have ever seen it to date, no more rolling on the SSTV frame storer", WB0QCD (30 miles and the one of the farthest away in the Group) P3.5, "came up a whole P unit here-much brighter and now hear audio subcarrier all the time!", KA0BVT (30 miles) P2-3 with audio now, W9VSR (9 miles)

Absolutely P5 with great color and sound!", WA9SBW (4 miles) "solid P5. I'm going to get a color TV set!", K9FYV (miles) "down a bit here, P3, might be band conditions. Users viewed each others direct simplex signals and checked commercial UHF-TV signals to verify no band enhancement conditions existed to falsify current readings. TEST#9-Later, switching tests were conducted between the still installed former SEMCON "upside down" turnstile and the new 8 beam KLM-440 antenna systems. The results favored heavily toward the new 8 KLM antennas.

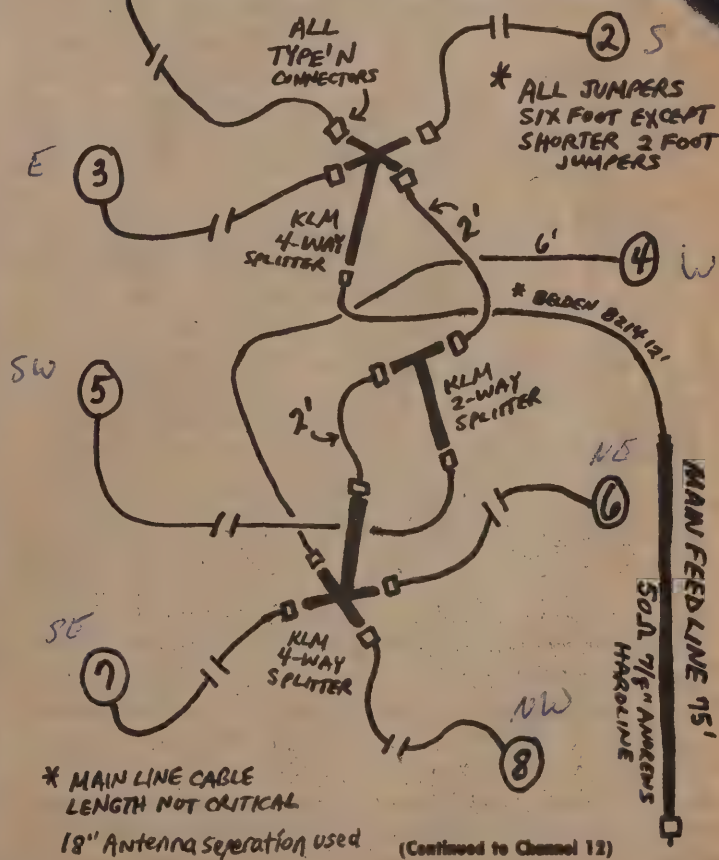
#### Objective Was Obtained. . .

The primary objective that was initially sought at the beginning of these experiments was to come up with a horizontally polarized, omni-directional ATV repeater antenna system WITH SOME GAIN, that would outperform the previous SEMCON system thereby "extending the maximum useable range" and "enhancing the quality of signal level" to all ATV users. With the demonstrated RF radiation pattern plot and antenna test results now completed, it was proved that such an undertaking could be successfully accomplished. Lacking expensive, sophisticated and accurate measure to equipment available, it was estimated that the GAIN of 8-array KLM-440 system varies between 4-5 dBd (that's a good honest rated vertical ground plane antenna system). Total cost of the KLM system was around \$425.00. NO NEED TO CHANGE ANTENNA POLARIZATIONS...

#### PHASING HARNESS FEED TO

#### KLM-440 6 ELE. ANTENNA

i.e. N9CAI/R (DIFFERENT THAN 6 PHASES)





Continued from Channel 11)

With the weather still holding in mid December and N9CAI/R REMOTE TRANSMITTER looking strong all directions, N9AEP, W00AMA and W80QCD decided to do some further work on the "receive" antenna system for the "REPEAT" mode. The 1983 purchased horizontally polarized, CUSHCRAFT AFM-44D 8-bay dipole array (see AS/USATVS Journal OCT 85 Vol. 13 #10 issue) system was remounted on a 28 foot mast and mounted tied to an iron ladder on the far north end of the St. Ambrose College's rooftop location which accessed a 15 foot upper structure level that currently houses COX Cablevision's Microwave Relay Dish and Commercial TV Antenna Tower (see graphic diagram). A 2-way KLM splitter was placed feeding the 2 bays of 4 dipoles. Antenna arrangement tests favored a NW/SE bi-directional pattern to produce the most gain each direction while others appeared to be close or strong enough to enter the system off the sides. A brand new run of 200 foot of BELDEN's RG-9913 coax (2.5 db loss per 100 foot at 400 Mhz., see AS NOV. 84 issue) ordered from "THE WIREMAN" of CERTIFIED COMMUNICATIONS in Fremont, Michigan was installed. Practically all of the 200 foot run was used running down the antenna structure mast, across the roof, down an access hatch and into the ATV REPEATER room on 3rd floor of the Ambrose Galvin Fine Arts and Communications Center.

#### Repeat Mode Tests

Most actual inband "REPEAT" tests (now also with the new 48 beam array for transmit) were very encouraging! By all of the Quad-City ATV Stations were now repeating the N9CAI/R system with very little desense. Most were strong enough that no desense at all could be noticed as the repeater's transmitter was engaged. N9AEP could not access the system at all due to a "in the hole" South Moline location, KA0BVT 30 miles out in Moscow was just beginning to trip the system (with 50 watts) and W80QCD could not even trip up the PC VOR relay to start up the transmitter (30 miles). Height on the CC AFM-44D system was still the needed answer (even 20 feet atop a 3 story building). A 48 foot heavy duty "pushup" mast was brought in the morning of December 15th (meeting day) and erected replacing the 28 foot pipe. On Sunday, December 16th and thanks to a visiting Henry Ruh KB9FO, the 48 foot pushup was extended to approximately 38 feet which now matched the height above roof of the KLM transmit antennas. Nylon rope guys were tied in place and FSTV tests rolled in. APPROXIMATELY 75 FEET OF SEPARATION EXISTS BETWEEN THE TRANSMIT & RECEIVE ANTENNAS! This is a greatly reduced figure in comparison to previously longtime thought and published belief that over 400 foot of separation would be required to obtain a 47 db isolation factor in addition to the 100 db isolation factor produced by the Copper Interdigital Bandpass Filters. So much for theories. With the raised height, N9AEP was now P4+, KA0BVT was P3, W80QCD P2-P3. All others, also saw about another 1/2-1 P unit increase improvement on their incoming signals. DESENSE WAS GONE! Even weak signals at P1 locked and held nicely. THE HORIZONTALLY POLARIZED N9CAI/R ATV REPEATER SYSTEM AFTER 2 YEARS OF WORK WAS WORKING!!! Audio subcarriers and COLOR passed thru the system with no problem and could be heard 30 miles out (no band enhancement) with P3.5 quality.

It was felt that an ADVANCED RECEIVER RESEARCH P432V06 PREAMP would help enhance the received signals greatly as well as tune out and possible unwanted non-ATV signals (including any desense) and was ordered. It will be placed near the CC AFM-44D system mast mounted with 12 vdc fed from a room below the mast. Tests will be conducted in January with 50 to 100 watts on the N9CAI system which will bring the picture signal levels up even further. The question then becomes at what point does "power" conflict with desense on "receive". Henry Ruh KB9FO reclaimed his on-loan Wraase SSTV Converter and the scanning video feed input switcher was modified to 1 minute "live" camera test pattern, 1 minute Ambrose TV Dept. feeds (and colorbars) and 2 minutes Club Computer graphics and bulletin board.

#### What's The Scope Say?

KB9FO used W80QCD's RAMSEY BS-601 Oscilloscope to check the video signal going out of the N9CAI/R system and video to sync levels looked good with expected slightly reduced syncing levels noticed on the TRS80C Computer feed. The PC "Kreepy Peepie" RTX-4 Transmitter and MIRAGE Amplifier was doing a good job at "repeating" what was coming into it. The sensitive VOR Relay "chatters" on marginal signals that drop in and out of the system just as with any audio COR. A BIRD 43 wattmeter with 10 watt 200-500 Mhz slug was inserted after the MIRAGE D24 Amp and before the 7/8 inch Andrews hardline. With no video signal present (only carrier) it layed gently at a full scale of 10 watts. Average video signal power (dependent upon the feed and content) showed 6 to 8 watts going to the KLM beam antennas. SWR WAS FLAT with no reflected movement on the meter at 421.25 Mhz. The very efficient .5 db rated loss on the Andrews hardline would have showed the slightest reflection if any were there coming back into the transmitter. This reading, settled some worry about the broadbandness of the "claimed" 420-470 KLM-440 yagis.

#### More Mods. . .

Other "inside the cabinet" modifications by N9AEP include a 12 vdc/100 vac relay system that when the 4-2-1-x touchtones are sent on 144.340 Mhz. to bring up the N9CAI/R REMOTE TRANSMIT MODE, it fires up the "Live Camera" and 34 watt reflector light hardware (focused on the test pattern). It was thought that such a touchtone relay could also include the TRS80C Computer (and disk drive since the new AUTOEXEC IC Chip was installed in the disk controller) but was later removed as the 10 minute time out device shut down the computer and any restart made the computer reload and start it's looped programming sequence all over again. The 25 "looped" programs and ATV Bulletin Board takes about 30 minutes to complete one complete cycle and wasn't being viewed. To help eliviate the stress on a 24 hour on-line computer and disk drive system, a 24 hour 110 vac appliance timer was installed. The TRS80C Color Computer and Disk Drive now comes on at 6 am. in the morning and shuts down at Midnight (even hard working computers need sleep!). All other feeds remain TT Relay activated. A slight delay exists on the firing of the "live camera" which is 75% unnoticed, as when turned on, is not usually viewed by the user as the system is looking at another video feed input to the transmitter.



## Reflecting and Projecting

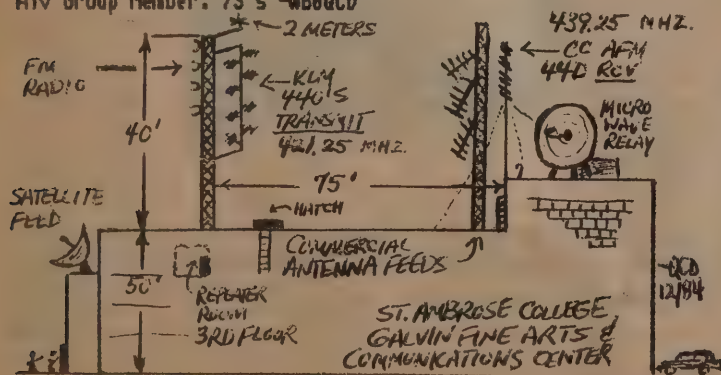
Looking back (and to future possible enhancements in the spring), the crystal controlled MM downconverter might be better placed just under the new receive antennas with needed voltage fed from the microwave relay system room. It might eliminate the need for a preamp? The expensive 9913 can then be used elsewhere or returned to it's owner. The PSF439 copper bandpass filter should then be placed ahead of the downconverter or any preamp to filter out any garbage before it enters the preamp. Why make it work overtime? GRIFFIN ENTERPRISES has been contacted in the placement of a DA-4 Video Distribution Amplifier circuit and PA-1 Video Processing Amplifier all housed in one rack mounted container. It will have BNC output test taps so that an OSCOPE can be attached to it easily at any time to sample what is going thru the N9CA1/R system. Hopefully, even a rack mounted OSCOPE can be obtained for the system. Higher power and a more elaborate touch-tone decoding system is on the drawing boards. You have to crawl before you can walk. N9CA1/R is now "walking" and with a bit more work, a little more time and a few more bucks fed into the system and it will indeed be "running".

### Let's Hear From Others!

"A5" would like to hear what your ATV Group or Club has been doing on similar projects. Won't you take a few moments and jot down some of the trials and tribulations that your group went thru getting your UHF FSTV Repeater system going? Your group's ideas and operations spark the interest of others around the country. Such exchanges of information further develops the ATV state-of-art and afterall, that's what it's all about isn't it?

### N9CA1/R

It's quite a system, and Quad-City 11L/IOWA ATV Group Members are darn proud of it! It is the first such "working" "on-the-air" ATV system ever in the State. It is unique in that it is less than half a dozen Known HORIZONTALLY POLARIZED ATV REPEATER SYSTEMS NOW OPERATING IN THE COUNTRY. We thank those groups ahead of us for the pioneering spirit that kept this idea alive. The system proves that with sound, careful planning, confidence and perhaps more importantly "non-interference" to those who are building it, along with alot of hard work—that it can be done. Midwestern ATV'ers may view the N9CA1/R system itself at the upcoming annual February 24th Davenport, Iowa W0BXR HAMFEST. A special FSTV Meeting is planned the night before at the HOLIDAY INN NORTH on Brady Street (just off of I-80 and Hiway 61 South). For further details contact any 11L/IOWA ATV Group Member. 73's -W0B0CD



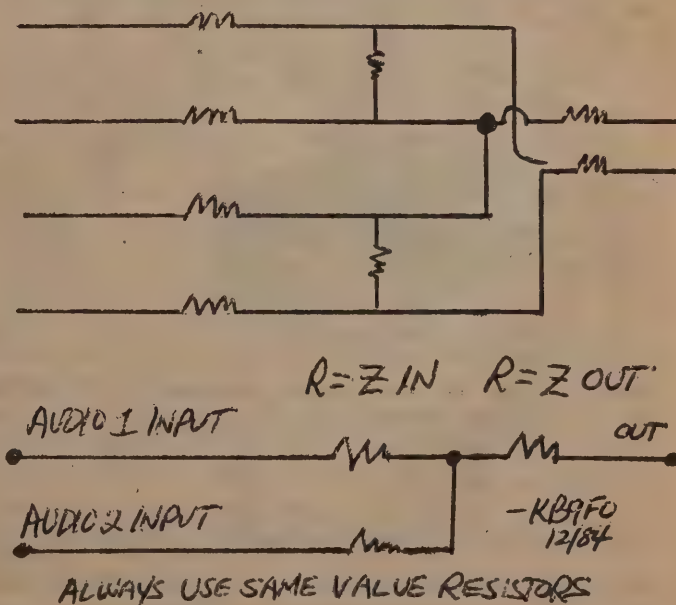
## Then, The Building Inspector arrived. . .

I came out to Iowa basically to harass W0B0CD and see he was keeping things still in line at "A5". He is indeed surviving poverty and has yet to rehook up his telephone. Say's he kinda likes the peace and quiet for a change. I must confess, the "A5 HOTLINE" 319-944-7669 number does work as he returned one of my calls in just a couple hours. By then, my answering machine told him that I was gone. Such a thing could go on and on. While at BCD's, we worked KA0BUT on FSTV 25 miles away. I gave Mike a refresher course on how to use his fancy looking RAMSEY BS-601 OSCOPE. He was already watching incoming video "off-air" signals. BJT's video signal looked lousy and lacked sync. We convinced Don to get out his alignment tools just one more time. He showed us a rather large screwdriver that he used which looked like it belonged to "Andre the Giant"! He tinkered and tweaked while we commanded him on 2 Meters and watching the scope. Finally after a few minutes and readjusting the PC BIAS control, SYNC was present, greys were back and he was looking fine again. Guess what, he now made it into the N9CA1 ATV Repeater system with no problem. Amazing what a little sync will do to VOR relays!

### Dual Audio Feed

Mike mentioned that he wished somehow he could route the computer and 2 Meter FM audio into the FM sub input of N9CA1/R's RTX-4 transmitter. When he tried Jack jumpering, it didn't work. I wired up a simple "quick-fix" circuit described below and once installed it worked. Might be a good idea for others instead of trying to use more expensive "audio mixers"? The 75 foot separation with hardly no desense didn't surprise me at 10 watts. It takes only 83 feet horizontal separation to separate 100m ERP in the broadcast industry, so what's the big deal on 10 watts? Congratulations to those who have been doing the work and paid their dues into the N9CA1/R project and shame on those who didn't. 73's gang! de Crazy Henry KB9FO signing clear...

### BALANCED DUAL AUDIO FEED CIRCUIT



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## TC-1 PLUS

SEE WHO YOU ARE TALKING TO! Show the shack, describe projects, run video tapes, computer programs, etc . . . in full color, sound, and in live action.

### STANDARD FEATURES:

- **10 WATTS PEP RF OUTPUT.** Crystal controlled continuous duty transmitter. Specify 439.25, 434.0, 426.25 standard other 70 cm freq. 2 freq. option add \$26.
- **USE, MOBILE, or PORTABLE.** Use the builtin AC supply or external 13.8 vdc at 3 amps.
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- **RECEIVE ON YOUR STANDARD TV SET** tuned to channel 3 or 4. Sensitive varicap tuned downconverter covers simplex and repeater freq over the whole 420-450 mHz 70 cm amateur band. Low noise NE64535 preamp stage.
- **VIDEO MONITOR OUTPUT** of your transmitted picture makes video gain, lighting, etc. adjustments easy & accurate.
- **ATTRACTIVE 10 1/2 x 3 x 9 aluminum cabinet** with woodgrain covering, and special aquadag conductive coating inside for full shielding.

### SO WHAT ELSE DOES IT TAKE TO GET ON ATV?

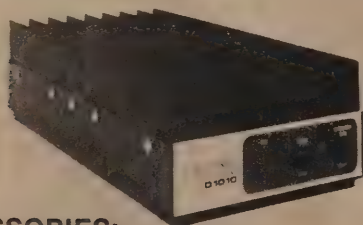
The antenna is really the secret to success with ATV. We suggest the KLM 440-27 Beam antenna with its high 14 dbd gain and wide bandwidth, and some of our Saxton 8285 low loss coax between it and the TC-1+. Antenna height at or above the tree tops makes a big difference. Line of sight DX is about 40 miles.

Any standard TV set is used as the receiver. The TC-1+ downconverts the 70 cm ham band down to channel 3 or 4. Just connect a short coax from the TC-1+ to the TV sets antenna input.

Any source of standard 1 volt composite video, such as is found in portable color or black and white cameras, VCRs, or computers can be plugged into the TC-1+ and transmitted to another station. Repeat SSTV to local ATVers. Audio can be from a low Z dynamic mic, or line level from cameras, VCRs, computers, etc.

Its really quite simple to have your own TV station capable of sending and receiving video 15 to 100 miles and more. DX with this set up is similiar to 2 meter FM with omni antennas.

**THATS IT! It's easy!**



### ACCESSORIES:

- |   |       |            |           |
|---|-------|------------|-----------|
| Mirage D1010N 100 watt pep all mode amp   | ..... | \$298 del. | 300       |
| 450 AEA Isopole omni antenna              | ..... | \$65 del.  | 400       |
| Saxton 8285 low loss 50 ohm coax, 100 ft. | ..... | \$41 del.  | 700 / 500 |
| KLM 440-27 14dbd 70cm beam antenna        | ..... | *\$89 del. |           |

If you wish to build your own system, see module page. The TC-1+ contains the TXA5, PA5, FMA5, TVC-2L, & DM-1 module functions. Tech class or higher license required for purchase. Normal shipment within 2 days on charge card or postal money order.

**P.C. ELECTRONICS • 2522 PAXSON LANE • ARCADIA, CA 91006 • (818) 447-4565**

**TOM W6ORG MARYANN WB6YSS 8-84**

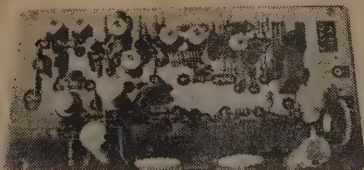
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## The Basic 3 Transmitting Modules (buy all 3 save \$8) ...\$199



TXA5-5



PA5



FMA5

### 1. TXA5-5 ATV EXCITER/MODULATOR ..... \$89 del

Wired and tested module provides 80 mw to drive PA5 10 watt power amp. High/low power switch for normal 10 watts with PA5, or adjustable for high power amps such as Mirage D1010N. Accepts standard 1 volt composite video from color camera, VCR, computer, etc. Wideband modulator gives excellent color and high resolution. Built in sync expander. Draws 70 ma at 13.8 vdc. One crystal included, but 2 freq requires another crystal at \$15. We stock 439.25, 434.0, & 426.25 mHz, other 70 cm freq may take 3 weeks. CA-2 on-carrier audio module single freq, add \$40. Two frequency \$55.

### 2. PA5 10 WATT PEP ATV POWER MODULE .....\$89 del

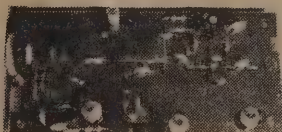
A Motorola MHW-710-2 is mounted on a heat sink with stripline PC board to give over 10 watts pep video when driven by the TXA5. 50 ohms in and out. Broadband, covers the entire 420-450 mHz 70 cm band with no tuning. Draws a little over 2 amps at 13.8 vdc reg.

### 3. FMA5 AUDIO SUBCARRIER GENERATOR..... \$29 del

Transmits broadcast standard sound with your picture. Accepts a low Z mic (100-600 ohms). also line level audio from VCRs, camera mics, computers, etc. Up to 1 v p-p drive to the TXA5, VM-2, or VM-3 modulators. Works with any transmitter with 5 mHz modulator bandwidth. Draws 20 ma from 13.8 vdc supply.

All modules can be run from a 3 amp 13.8 vdc regulated power supply. A good UHF T/R relay should be used, we stock the Magnacraft W120X-14 at \$44 delivered. The modules should be mounted in an aluminum chassis or cabinet for heat sinking and shielding. See chapter 14 of 1984 ARRL Handbook.

## 420-450 mHz ATV RECEIVING DOWNCONVERTERS



TVC-2



TVC-2G



TVC-4

### TVC-2 ATV DOWNCONVERTER .....\$49 delivered

Wired and tested module connects between 70 cm antenna and TV set tuned to channel 2, 3, or 4. Varicap tunes the whole 420-450 mHz amateur band. Sensitive MRF901 preamp, stage digs out the weak ones and the hot carrier double balanced mixer resists intermods and overload. Requires +11 to 18 vdc at 20 ma.

### TVC-2L more sensitive with NE64535 preamp stage .....\$59 del

### TVC-2G most sensitive with GaAsFet (.5db NF) stage .....\$79 del

It can be mounted in the shack, but is designed for antenna mounting for best sensitivity (Besides low noise figure, you gain the feedline loss). Has extra double tuned bandpass filter to reject strong UHF TV stations.

### DCB DOWNCONVERTER CONTROL BOX .....\$59 del

Provides variable 10 to 18 vdc thru coax to antenna mounted downconverters such as TVC-2G and TVC-12G. Also has 15 db gain line amp to drive long lines or splitters. Ready to go, comes in same cabinet as TVC-4.

### TVC-4 PACKAGED DOWNCONVERTER with AC supply...\$89 del

Contains the TVC-2, 120 vac supply, ready to go. BNC antenna input and F connector TV output. Handy for ATV demos, or community TV systems outside of the USA. Size is 5.3 x 2.5 x 7 inches.

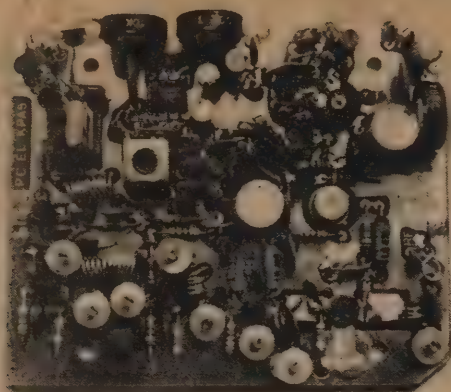
### TVC-4L contains the more sensitive TVC-2L.....\$99 del

\*Attention clubs, groups and exporters ..... the following quantity discounts apply to one module ordered at one time and sent to one address: 5-24 10%, 25-49 15%, 50-99 20%, 100-up 25%.

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# THE "KREEPIE PEEPIE" ATV TRANSMITTER IS HERE!



## KPA5 1 WATT ATV TRANSMITTER BOARD FEATURES:

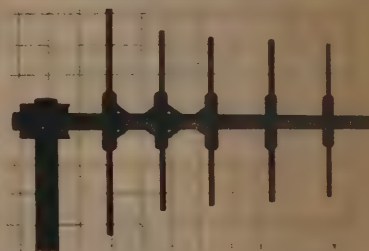
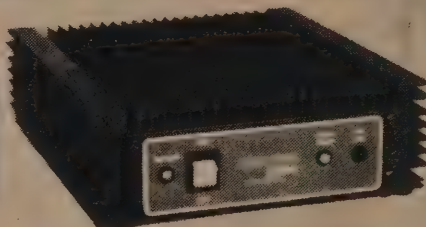
- ★ 1 watt pep minimum RF output on sync tip.
- ★ Full color and sound on one small 3.25 x 4" board.
- ★ Composite video input from camera, VCR, etc.
- ★ Runs on external 13.8 vdc at 300 ma supply or battery.
- ★ Wired and tested board covers 421 to 439 mHz.
- ★ Supplied with one xtal on 426.25, 434.0, or 439.25 mHz but capable of 2 freq operation with the addition of 2nd xtal (add \$15). Other 70cm freq. available on special order.
- ★ Mic input from a low Z dynamic and line level audio input found in most portable color cameras, VCRs, or home computers provided.
- ★ Schematic and application notes supplied for typical external connections, packaging, and system operation.
- ★ Price delivered via UPS surface in the USA is only **\$159**. Technician class amateur license or higher required for purchase and operation.



## DO SOME OF THESE APPLICATIONS INTRIGUE YOU?

1. **PORTABLE CORDLESS TV CAMERA.** No heavy VCR to lug around or cable length limitation. You can even use your home VCR rather than a portapak. Now you can creep around and peep thru your camera more easily. Gives good pictures up to a mile with simple whip, and 40 miles using beams in flat terrain.
2. **MOBILE OR PORTABLE ATV** for public service events such as races, parades, marathons, etc. A Mirage D24 40 watt amp can be added for greater mobile coverage or base operation. Mount in an airplane for CAP and rescue searches for an eye in the sky.
3. **REMOTE CONTROL OF R/C AIRPLANES or ROBOTS.** Fly with a camera in the nose to control as if you are in the plane. Likewise a robot can now be out of site of the operator.
4. **REPEATER SITE SECURITY OR COMPUTER VIDEO DISPLAY.** Turn on thru your repeater a camera at the site to see the area, weather, read meters, or if a computer is used, show status, play games, etc. by remote control. With all the new technology using TV displays, it is natural for hams to adapt these new products to transmission over the air. What applications come to your mind?

**WHAT IS REQUIRED FOR A COMPLETE OPERATION SYSTEM?** A TV set with a TVC-2 or TVC-4 420-450 mHz to channel 3 downconverter, 70 cm antenna, and coax cable to receive. Package up the KPA5, add 12 to 14 vdc, antenna, and any tv camera, VCR, or computer with a composite video output. Simple, eh?



## ACCESSORIES:

Downconverter: TVC-2 wired & tested board ..... \$49  
 Varicap tuned. Requires +11 to +18 vdc at 20 ma.  
 TVC-4 (TVC-2 in cabinet with ac supply ..... \$89  
 more sensitive "L" versions with NE64535 preamp stage add \$10.

Mirage D24 1 in / 40 watts out all mode amp. .... \$179  
 450 ISPOLE omni gain 70cm antenna ..... \$65  
 KLM 440-6 8 dbd gain 60° beamwidth antenna .... \$38  
 KLM 440-27 14.5 dbd gain broadband 70cm antenna ... \$89  
 100' roll Saxton 8285 50 ohm low loss coax ..... \$41  
 VOR Video Operated Relay board ..... \$25  
 800J 10 pin Fem. Color Cam. Chassis Connector.... \$10

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TELEX 380172



8-84



# TXA5 ATV EXCITER / MODULATOR

## Description:

The TXA5-5 ATV Exciter-Modulator is designed to fully drive the PA5 Linear Amplifier to 10 watts PEP. The Modulator section has 8 MHz bandwidth for excellent color and computer graphics reproduction. The FMA5 can be directly connected to the 4.5 MHz sound subcarrier mixer input. The video is clamped to ensure maximum power on the sync tips regardless of the average picture contrast. At the nominal 80 mw output the 13.8 v reg current is 75 ma.

The RF section consists of a 5th overtone crystal oscillator, two doublers, and a final. Starting with a crystal around 100MHz prevents harmonics from desensitizing two meter FM used for talk-back and atv coordination. The stock board comes with one crystal but a second crystal can be inserted for 2 freq. operation. Additional crystal are available from us for \$15 ea. Specify type KW-25 and output frequency. We stock 421.25 (repeater output), 426.25 (most used 2nd freq), 434.0 (used in areas of high UHF FM repeater activity and outside of the USA), 439.25 (midwest and eastern USA), 1241 and 1253 MHz for use with varactor triplers. Other freq. may take up to 4 weeks from us or call KW Mfg direct at 405-5672285 (Fo/4, type KW-25, .005%).

**(V) VIDEO INPUT.** Twisted wire may be used if the run is less than 4 inches, otherwise use small coax. The 100 ohm video gain pot may be removed and 3 twisted wires run to a 100 ohm carbon panel pot in your chassis. Do not use a wire-wound pot. 500 ohm carbon pots are easier to find and may be used if a 100 ohm resistor is paralleled across each end.

**(S) AUDIO SUBCARRIER INPUT.** Use small coax such as RG-174 from FMA5 subcarrier board. Attach on the bottom side of the board.

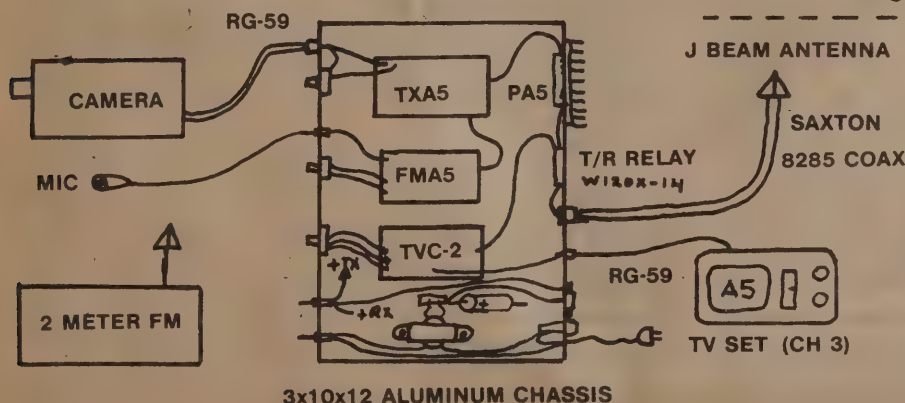
**(+) 13.8 VDC INPUT.** Run short #22 red lead to regulated power source such as Radio Shack 22-124 or battery. Any ripple will show up in the video. Ground return can be by wire or thru the chassis mounting screws.

**RF OUTPUT.** Use only 50 ohm coax such as RG-174 or RG-58 between TXA5-5 and PA5 power module or antenna. The coax center conductor must be no more than 1/4 inch out of the shield or serious VSWR could result.

**(F) 2 FREQ. SWITCH.** No connection for single frequency, wire thru a external spst switch to ground to switch to the second crystal.

**LOW POWER SWITCH.** Run twisted wire to a external spst switch if the pedestal power needs to be reduced to drive a high power amplifier.

## TYPICAL ATV STATION SETUP:



## OPERATION:

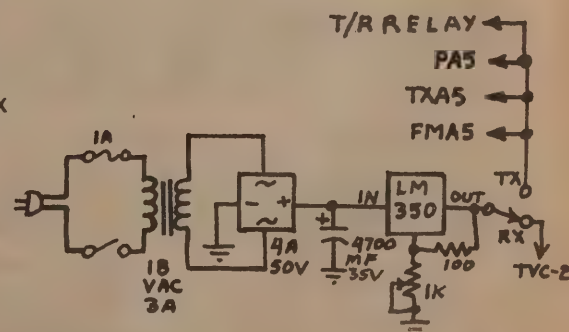
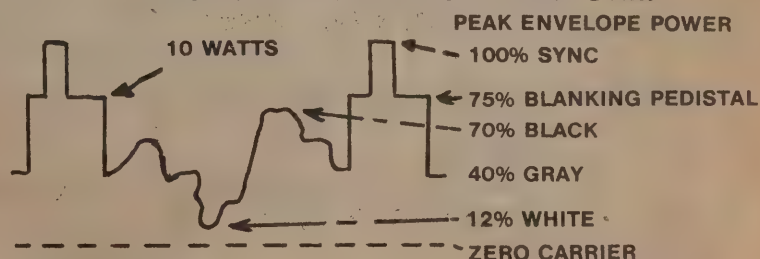
The TXA5-5 is tuned up at the factory. However, some capacity to your chassis, handling, shipping vibration, and drive variations between MHW-710-2 power modules may require fine peaking and adjustment. With no video applied, turn on the +13.8 regulated DC to the TXA5 and PA5. Note the RF power output on a good power meter and dummy load designed for the frequency. If the RF power will not reach 12 watts with the pedestal pot wide open, try repeaking each trimmer with an insulated tuning tool. With 2 freq., each stage will have to be peaked for the highest equal value between the two freq. Note the layout and schematic for voltmeter test points and affected trimmers. A 50 microamp meter (RS 270-1751) can be connected at (D) to indicate relative exciter RF output, 30 to 40 is the usual reading. Now set the pedestal pot for no more than 10 watts output with no video connected.

Connect the camera or other video source and slowly increase the video gain until the white portion of the picture limits and then back off a little. It is best to monitor thru a DM-1 detector, repeater output, or have another ham who is at least 1 mile away talk your picture in via 2 meters (144.90 and 146.43 are the most used ATV coordination freq.). Your own TV is too close and may give a false indication from front end overload and reflections.

Power output on an average reading meter, such as a D1010N amp, will decrease as the video gain is increased. An all white picture will give around 5 watts indicated, and a black picture between 8 and 10. However, since the video is clamped, blanking pedestal set at 10 watts, the actual pep is between 12 and 14 watts on the sync tip.

If a higher power amplifier is to be used, the low power pedestal pot can be adjusted for the proper drive down to lower than 2 watts out of the PA5. In the case of the D1010N amp, the low power switch is closed and the power pedestal pot is set for no more than 80 watts output with no video connected. This will give over 100 watts pep on the sync tip due to the sync stretcher in the modulator. Readjust the video gain for just before white limiting. An all white picture will read around 50 watts and all black around 80 watts.

## MODULATED VIDEO WAVEFORM



13.8 VDC 3 AMP REGULATED SUPPLY



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# 73

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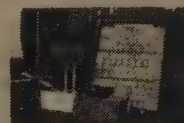
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### Installation Guidelines ARR GaAsFET Preamp

**EDITOR'S NOTE-** Advanced Receiver Research has been making a fine line of VHF/UHF preamps for years now. Their "service" to ATV'ers has been as reported to A5 ATV MAGAZINE. A recent order for Model for our N9CA1/R system brought with it the new information. It is recommended reading (or for those of you now using or contemplating using preamps UHF-ATV (WB0QCD).

#### Caution! Delicate Device

GaAsFET preamplifiers offer significant improvements in noise figure, gain 1 dB compression and 3rd order intercept characteristics over bipolar, JFET and dual-gate MOSFET types. Preamplifiers utilizing GaAsFETs devices require some special care in installation not normally associated with the other types. GaAsFETs are designed for microwave use so the internal structural dimensions are extremely small, therefore operating and breakdown voltages are considerably lower. Additionally, the GaAsFET device contains no internal protection such as back-to-back, gate-source diodes as used in dual-gate MOSFETs. For these reasons, the GaAsFET preamplifiers are more easily damaged than bipolar, JFET or dual-gate MOSFET types. Nevertheless, properly installed preamplifiers will provide years of trouble free operation.

ARR GaAsFET preamplifiers have built-in protection against: (1) normal static buildup at input. ARR GaAsFET preamplifiers incorporate a resistive bleeder for normal wind, rain and snow static plus reasonable lightning charge buildup. This bleeder is not capable of protecting against extremely close or direct lightning strikes. If the preamplifier is to be installed in a particularly harsh environment, some form of external static protection device may be necessary. (2) reverse power supply voltage. (3) power supply transients. All GaAsFET preamplifiers use an onboard power conditioning circuit to provide the GaAsFET device with a clean and stable supply voltage.

value.  
Crowbar  
voltage to  
value.

#### GaAsFET

Since repeater environments, are cause device failure through the use of rather than the placement of a bandpass/band preamplifier to select centered on the receive buildup at all other frequencies cavity, effectively eliminating band reject type of effect. When cavities are preamplifier sees the entire narrow window centered on the bandwidth over which the desired tremendously greater for the systems already using a band a single bandpass cavity protection. An additional reject duplexer system is that out-of-band signals are eliminated



adequate  
level. Minimum

#### Isolation

50 W	40 dB
100 W	43 dB
200 W	50 dB
300 W	53 dB
400 W	56 dB
500 W	59 dB
600 W	62 dB

At a particular relay always measure the isolation by pulling it in the system.

#### Mounted Within Transceivers

Transceivers without case and connectors. Preamplifiers are normally connected to the receiver antenna transmit/receive relay (switching) and the input to the existing transceiver. The precautions outlined in the previous section on shielding and relay isolation, apply.

When installing a preamplifier directly to a transceiver antenna terminal even for receive only or test use, be careful of transceivers, even with microphone and key through the transmit mode briefly during power up. This instant of transmitter power is sufficient to cause preamplifier failure. Powering up the transceiver first and then connecting the preamplifier may alleviate the initial power up problem. However, should the power main or transceiver dc supply drop momentarily the transceiver power up problem will occur.

Copyright 1983, Advanced Receiver Research.

Model	Bandwidth (1 dB)	Noise Figure	Gain	Compression (1 dB)
P50VDG	4 MHz	<0.5 dB	24 dB	+ 12 dBm
P136VDG	7 MHz	<0.5 dB	24 dB	+ 12 dBm
P144VDG	7 MHz	<0.5 dB	24 dB	+ 12 dBm
P220VDG	12 MHz	<0.5 dB	20 dB	+ 12 dBm
P432VDG	40 MHz	<0.5 dB	16 dB	+ 12 dBm

Supply voltage: 10-16 Vdc  
Supply current: 15 mA  
Weight: 2.0 oz.

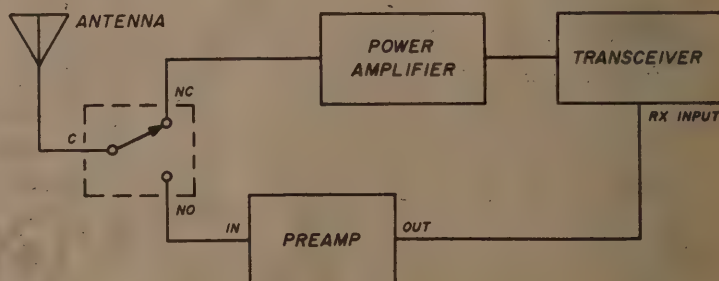
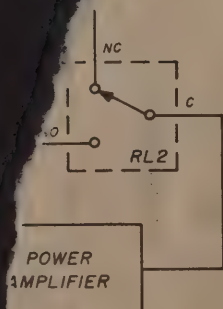
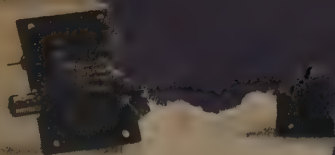


Fig. 2



# HIGH P



Receive Only	Freq. Range (MHz)	N.F. (dB)	Gain (dB)
P28VD	28-30	<1.1	15
P50VD	50-54	<1.3	15
P50VDG	50-54	<0.5	24
P144VD	144-148	<1.5	15
P144VDA	144-148	<1.0	15
P144VDG	144-148	<0.5	24
P220VD	220-225	<1.8	15
P220VDA	220-225	<1.2	15
P220VDG	220-225	<0.5	20
P432VD	420-450	<1.8	15
P432VDA	420-450	<1.1	17
P432VDG	420-450	<0.5	16

## Inline (rt switched)

SP28VD	28-30	<1.2	15
SP50VD	50-54	<1.4	15
SP50VDG	50-54	<0.55	24
SP144VD	144-148	<1.6	15
SP144VDA	144-148	<1.1	15
SP144VDG	144-148	<0.55	24
SP220VD	220-225	<1.9	15
SP220VDA	220-225	<1.3	15
SP220VDG	220-225	<0.55	20
SP432VD	420-450	<1.9	15
SP432VDA	420-450	<1.2	17
SP432VDG	420-450	<0.55	16

Every preamplifier is precision aligned on ARR's Hewlett Packard meter. RX only preamplifiers are for receive applications only. with transceivers) and handle 25 watts transmitter power. Mou and power amplifier for high power applications. Other amateur, co

## Advanced Receiver Research

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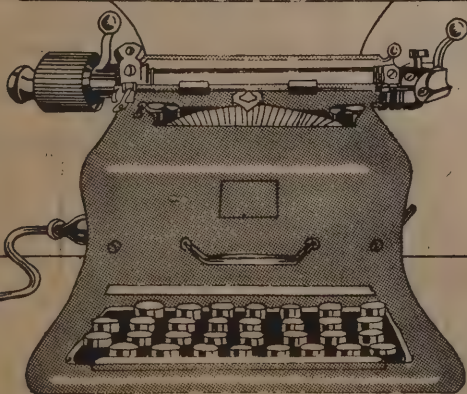
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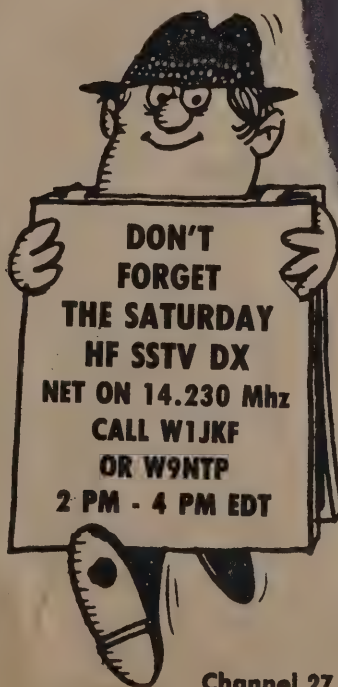
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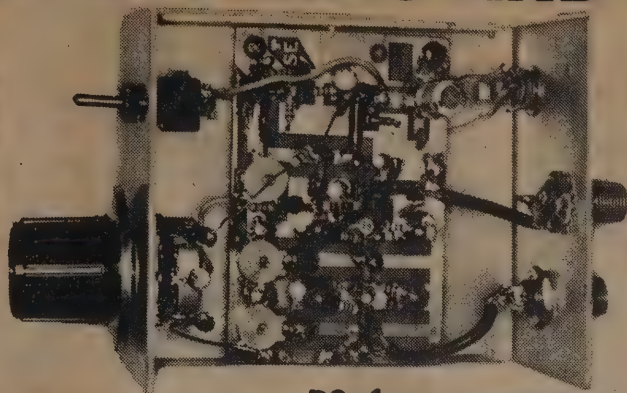
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# ATV KITS AND MODULES



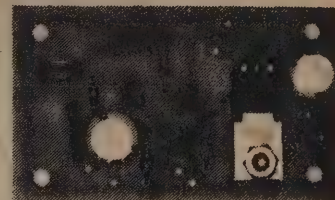
SA-1



DC-1



LA-1



VM-2

A-2 "Build It Yourself and Save!"

P-1

**VM-2 VIDEO MODULATOR** — Wideband collector video modulator for solid state exciters such as those from GLB and Hamtronics. Input for 4.5 MHZ audio sub-carrier. 2½" x 1½"; **\$15.50** kit, **\$19.95** assembled.

**A-2 4.5 MHZ AUDIO SUB-CARRIER** — Accepts audio from VCR or GLB audio processor to provide ATV audio on TV set. Has on-board voltage regulator and shielded inductor. 2¾" x 1"; **\$19.95** kit, **\$25.95** assembled.

**SA-1 VIDEO SYNC AMP** — Provides separate video sync gain control for VM-2 above or SE - 1a transceiver. Useful when driving solid state amps. 1¾" x 1¼"; **\$15.95** assembled, **\$12.95** kit.

**DC-1 UHF CONVERTOR** — Varactor tuned with 2 RF stages. BFO-74 Input standard. Double sided stripline design. Outputs to TV ch. 2, 3, or 4. Can be tower mounted. 11 — 14 vdc. 2" x 3"; **\$39.95** kit, **\$54.95** assembled, **\$89.95** complete in box. **Box kit \$30, includes all hardware for the DC-1.**

**P-1 WIDEBAND LOW NOISE UHF PREAMP** — Uses BFO-74 transistor for min. 18 db gain and 0.6 db noise figure. Covers 420—450 MHZ band. Other frequencies received with change in input inductor. 2¼" x 1 3/8"; **\$22.95** kit, **\$31.95** assembled.

**LA-1 UHF AMPLIFIER** — Uses 15 watt MRF641 transistor with 7.8 db gain @ 470 MHZ. Stripline inductors with on-board pin diode antenna switching for a receiver. Designed for wideband color video with exciters such as the GLB T450L that provides up to 3 watts drive. Drilled and tapped heatsink included (4½" x 1¾"). 1 to 3 watts drive typically gives 6 to 18 watts output. 12 — 14 vdc operation @ 4 amps max. Double-sided board is 4½" x 2". **\$79.95** assembled with test data.

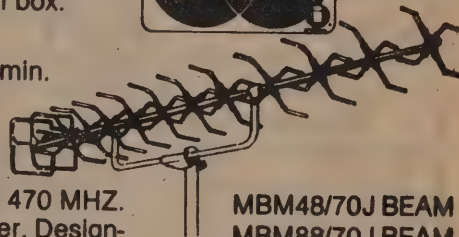
**LA-45 UHF AMPLIFIER** — Uses MRF 646. Input power of 6-15 watts typ. gives 20-50 watts output. Biased for linear operation. Kit includes all parts, instructions and 4.2" x 3" double-sided stripline board. Needs 12-14 vdc @ 9 amps max. **\$64.95** kit, assembled **\$80.** 4" x 5.5" x 1.75" heatsink **\$15.00.**

**GLB T450L TRANSMITTER** — 4½" x 2" RF board typically supplies 2—3 watts FM output, 1—1½ watts average video RF output. Changes for wideband video modulation provided. Comes with crystal for 439.25 MHX audio kit above. Also included separate 1" x 4" audio processor board which supplies audio for FM modulation for the A-2 4.5 MHZ audio kit above. 12—14 vdc @ 2 amps max. **\$69.95** kit, **\$89.95** assembled and tuned. \*Kit now with pre-wound coils\*

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*In fact, anything that can be displayed on a video screen can be converted instantly into a print.*

### FEATURES and SPECIFICATIONS

- **Instant Response**—you push a button, and the picture on your TV screen is instantly stored on a special memory chip and printed immediately.
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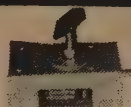
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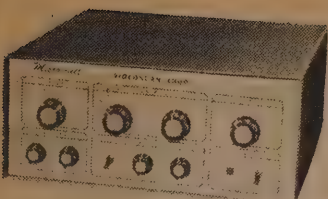


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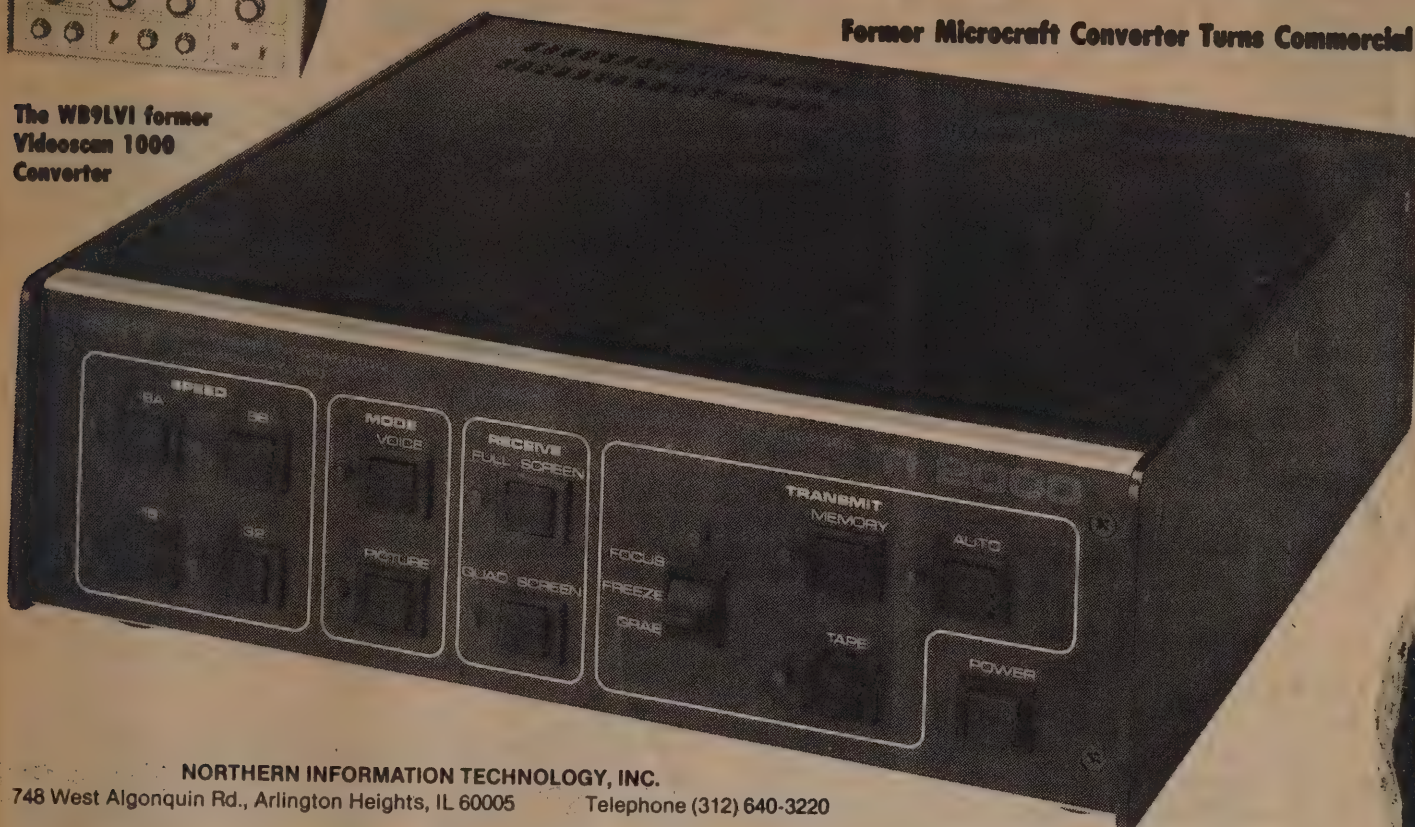


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Not long ago, George Steber's (WB9LVI) MICROCRAFT VIDEOSCAN 1000 SSTV Converter reigned supreme as the U.S.A.'s first home produced "true" HI-RES SSTV Converter displaying 256 pixel by 256 line, 64 grey level, 34 second frame rate pictures. It's construction began a new era of Amateur HI-RES picture experimentations. Many were sold to Amateurs not only in the U.S., but throughout the world. Last summer, Microcraft Corporation President Steber announced by written letter to "AS" that he had sold the VIDEOSCAN 1000 Division of the Company to Northern Technology, Inc. of Arlington Heights, ILL. Continued Non-Amateur production was anticipated by Northern Technology.

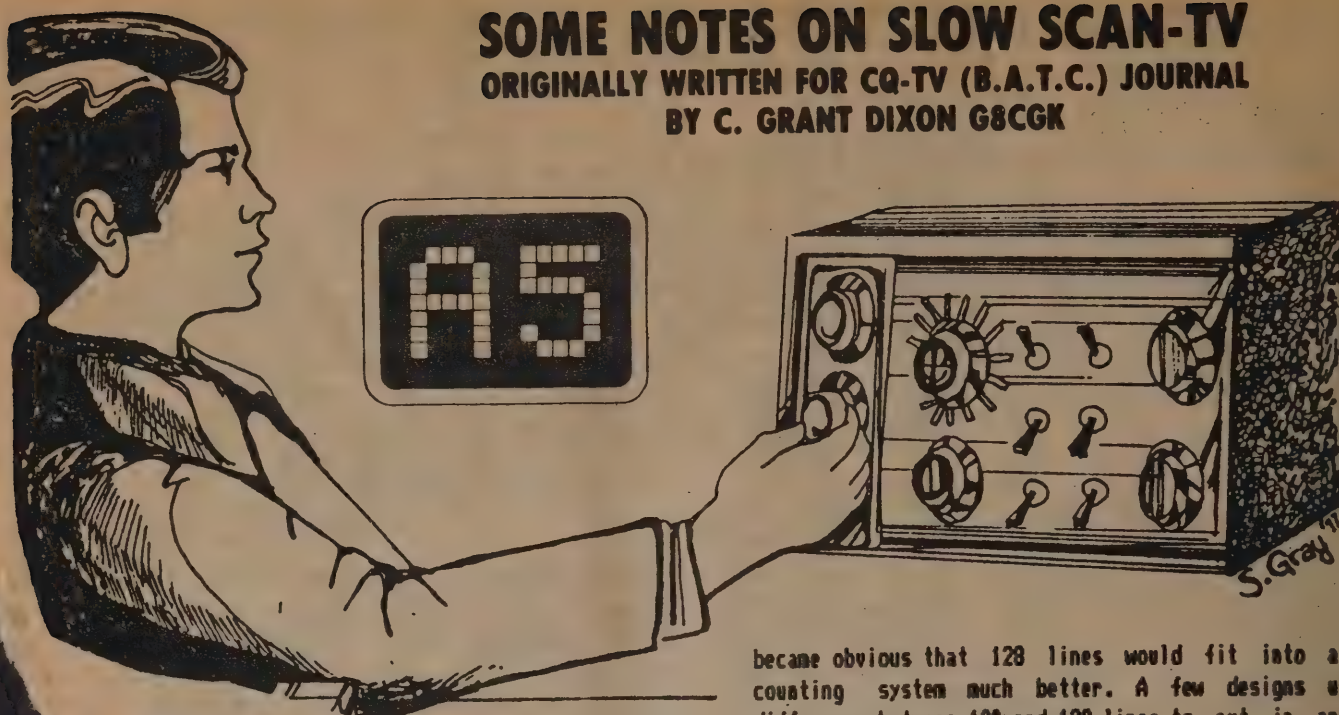
Today, "N.I.T." has announced a new Photo Imager System based on technology of the Videoscan 1000 unit. It is called; TELE-IMAGER Model TI-2000. In a modern sleek styled, new designed cabinet, the unit is designed for the commercial landline picture-phone business. It's new retail price of \$2,995.00 and \$4,150.00 for an extended TI-2500 unit ensures that very few SSTV Amateurs will show up with them on the airwaves. But then again, SSTV'ers are known to be a "rich crowd", so maybe a few will indeed turn up? Some of the specs on the N.I.T. TI-2000 includes: User friendly control panel with lighted status indicators, full screen and quad screen display modes. Three transmit speeds for various picture requirements and two screen memories in the high speed mode. Single frame transmission returns all stations to voice telephone operation after each picture. Exclusive Pix-Alert signalling feature allows any viewer to interrupt picture transmission and revert to voice, telephone operation at any time. Three position picture switch provides "Focus" (Live Camera) setup position and "Grab" position which operates like a camera shutter to instantly capture the desired image. Quick connections for monitor, video camera and telephone, and FCC approved built-in telephone coupler for use with any modular phone jack. Also Pictures may be saved and transmitted by using any regular audio tape recorder. There is an optional remote front panel control box. It can also be used with all standard CCTV accessories.

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# SOME NOTES ON SLOW SCAN-TV

ORIGINALLY WRITTEN FOR CQ-TV (B.A.T.C.) JOURNAL  
BY C. GRANT DIXON G8CGK



I have been actively engaged in SSTV since 1959, the year in which the first description of the system appeared in "magazine, and as there is an upsurge of interest amongst the newcomers to our hobby, I thought it would be a good idea to write down a few random jottings which could serve as background information and possibly food for thought.

**HISTORICAL-** First of all, it is not generally realised that the SSTV system originally devised by Copthorne Macdonald was an AM system with negative going video modulating a 2300Hz sub-carrier. After a couple of years trial with this system it soon became obvious that an FM system would give superior results, particularly from the point of view of ignition interference which, with the old AM system, gave rise to spurious sync pulses. Hence we now have our present FM system with 1200Hz for sync, 1500Hz for black and 2300Hz for white. How nice it would have been if the white frequency had been 2400Hz; so much easier for pattern generation, but this is a piece of history we have inherited. Another historical relic is the 1:1 aspect ratio of the picture; this was chosen so as to make best use of the circular 5FP7 radar type CRTs which had an afterglow screen and was used in the early monitors. These tubes gave good pictures, especially when viewed in the dark, but there was always the annoying fading of the trace and the brilliant refresh line coming down the screen. Modern scan-converters which use computer-style memories to display the SSTV picture on a standard fast-scan monitor screen have to fit the 1:1 picture into the 4:3 and 312-line picture (assuming no interlace). As the SSTV picture is usually 128 lines, this is done by displaying each line twice and thus using 256 of the 312 lines available; in addition a blank space is inserted at the start and end of each line as shown in fig. 1. The earlier SSTV experiments were all done with 120 lines, but with the advent of logic ICs for counters it

became obvious that 128 lines would fit into a binary counting system much better. A few designs used the difference between 120 and 128 lines to put in an 8-line section of grey scale to permit easier adjustment of the monitor.

Many newcomers do not realize that there are actually TWO standards for SSTV. In the USA the mains frequency is 60Hz and this is divided by 4 to give a line frequency of 15Hz; in the UK we use 50Hz divided by 3 to give 16.666Hz. The respective periods are 66.66ms and 60ms. Thus with a frame of 128 lines the vertical read-out time is 8.53s in the USA and 7.68s in the UK. As the lines of an American picture are longer, the use of a width control will bring them down to the correct size; similarly, our pictures look narrow to the American SSTV viewer and he has to adjust his width control in the opposite direction. When Cop Macdonald first devised the SSTV system, his aim was to send a reasonable picture within the audio bandwidth of a normal sound transmission—say 300Hz to 3000Hz— and the 120-line picture (128-line) does a good job in this respect. Of course, he could have chosen standards to give twice the definition in each direction, but the transmission of a single picture would have taken four times as long—about half a minute—and it was judged that the immediacy of 7s or 8s picture was a good compromise. After all, if you want really good definition you can use FAX, and if you want movement you can increase the bandwidth and use fast-scan TV.

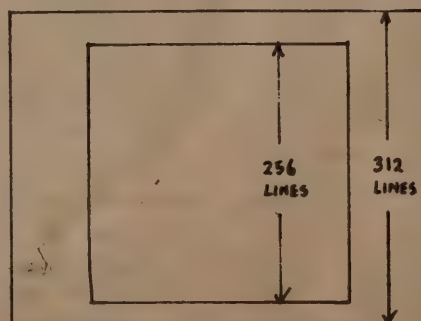


Fig.1  
Deriving the  
SSTV format.



**RESOLUTION-** Let us look into the question of resolution of an SSTV picture. At any given period of time during the picture, the frequency determines the level of grey. Thus the period of 0.5 of a cycle is the smallest "information packet" which is being transmitted, and one can only make use of this half-cycle if the waveform is symmetrical about the axis as can be seen in Fig. 2. When the waveform is asymmetric with respect to the axis then the two periods between the crossing points are different and would be interpreted as two different shades of grey. Now for a black signal:-  $f=1500\text{Hz}$ ,  $t=666\mu\text{s}$ ,  $1/2t=333\mu\text{s}$ , Line time= $60\text{ms}$ . less  $5\text{ms}$  for sync gives  $55\text{ms}$ , Hence the possible elements per line =  $55000/333 = 165$ . For a white signal:-  $f=2300\text{Hz}$ ,  $t=434\mu\text{s}$ ,  $1/2t=217\mu\text{s}$ , Hence possible white elements per line =  $55000/217 = 253$ , Average no. of elements per line is 209. For this we can see that the usual  $128 \times 128$  pixel scan converter is not using the full potential of the system. In fact my own experiments have indicated that a SFP7 monitor is capable of better resolution than a digital system providing that the CRT has a sufficiently small spot size on the screen. I wonder if anyone would like to design a scan converter with a  $128 \times 256$  memory which would give better resolution in the horizontal direction.

**SYNC PULSES-** There are two different ways of adding sync pulses to the SSTV video as shown in Figs. 3 & 4. In Fig. 3 the frame sync pulse, which is of  $30\text{ms}$  duration, starts at the end of the last picture line and continues until the start of the first line of the next picture. As a result of this, if the line oscillator is free-running, at the start of the picture the sync pulse is half the line period out of step with the oscillator and a "hard lock" circuit is needed to bring it rapidly back into step. In Fig. 4 the frame sync pulse occurs during the first line and the rhythm of the line sync pulses is not interrupted. I would strongly advise the adopting of this latter method even though it means the loss of the first half of the first picture line. A small price to pay for a more elegant system.

**SCAN-CONVERSION..Fast to Slow-** The first scan-converters used in SSTV were designed to allow a normal TV camera to be used for generating the SSTV signal. For this purpose there were two approaches, the line-sampling camera and the line-store converter. In the former a normal TV camera was modified so that its frame timebase was scanning at the SSTV line rate ( $50/3\text{Hz}$ ) and the camera was put on its side so that the picture was scanned vertically with  $3 \times 312$  lines. The grey value was sampled, using an electronic switch, for a brief period on each line and this series of samples constituted one SSTV line. The process was then repeated at intervals down the picture thus producing the required 128 SSTV lines. The great disadvantages of this method were the need to modify a camera and the difficulty of monitoring a fast-scan picture.

The second form of scan-converter cleared up these problems. In the line-store converter a single line of a fast-scan picture is digitised and clocked into a quadruple shift-register during the  $60\mu\text{s}$  of the line. During the next THREE fast-scan frames ( $60\text{ms}$ ) this data is clocked out of

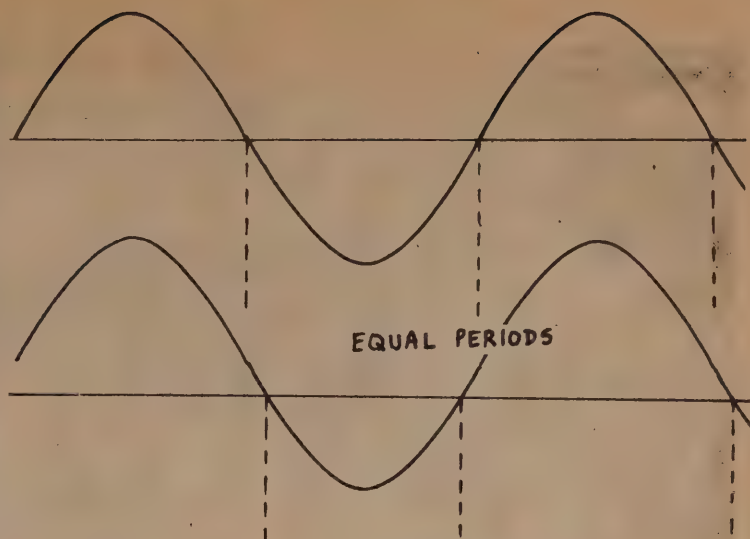


Fig.2

UNEQUAL PERIODS

the shift register at the slow rate thus generating the SSTV signal. The digitising process can be done with a string of 711 dual comparator ICs as shown in CQ-TV 118 P31. These are fairly cheap devices and this circuit will therefore appeal to the amateur constructor. Recently some "flash digitiser" ICs have appeared on the market which will digitise 16 levels (6 bits) at a rate of  $15\text{MHz}$ , but the price is astronomical as the performance. The string of 711s digitise to 16 levels (4 bits) and this is quite adequate for most amateur requirements. The limitations of 16 levels only become apparent when there are large areas of picture with only slight changes in the grey level and the phenomenon of "contouring" is observed. Contouring is less apparent where a picture has a lot of detail and there are rapid transitions through several grey levels, or where the number of grey levels is much larger - 64 for example.

The mention of "quadruple shift-registers" above, ties in with the 4 bits which the 711s produce; one shift-register is allocated to each bit. If the fast clock is made a little too fast then the first part of the fast scan line disappears out of the end of the shift-register and is lost. This is a good thing as it enables us to adjust the left-hand edge of the SSTV picture with relation to the fast-scan screen. See Fig. 1 again. Similarly, if the slow clock is too slow it fails to deliver the last bit of the line and this can be used to control the right-hand edge of the SSTV display. But shift-registers are now going out of fashion as a means of storage and they are being replaced by the more versatile RAMs (Random Access Memories) which are limited only by their access time. If they are used in a manner similar to the shift-register then they should be capable of being clocked at about  $5\text{MHz}$ , which means that the access time should be less than  $200\text{ns}$ . Dynamic RAMs are readily available with access times of  $150\text{ns}$  and these serve as very satisfactory picture stores. The main difficulty with RAMs is that each chip requires a large number of address lines and it is these addresses which must be clocked at the fast or slow rate; on the bonus side, however, is the fact that each picture element can be selected by using the correct address and one is not limited in the order in which they are selected.



**SCAN-CONVERSION..Slow to Fast-** When we come to consider the use of a fast-scan monitor to display SSTV it is easily seen that the required memory must be large enough to store a complete picture as the fast-scan display must repeat its display many times in the course of a single SSTV frame. In computer terms we need  $128 \times 128 \times 4 = 64K$  bits or 8K bytes. As there are 8 bits in one byte, we can store two 4-bit pixels in each byte. Memory chips are being made with ever increasing capacity and this amount of memory could be built using four 4116s (16K by 1 bit) or even a single 4416 which is conveniently 16K by 4 bits. Note that although dynamic RAMs usually require refreshing, if we are using them in a rapid read-out cyclical manner the refreshing will occur automatically and there is no need to make special provision for it.

One of the earliest slow-to-fast converters, which was designed by WB9LV1, used four massive recirculating shift-registers with some clever circuitry involving a line buffer store which was switched into the path of the recirculating data to give a 'load-on-the-fly' arrangement. The advantage of having RAMs for memory is that one can load a complete picture into memory in the fast-scan frame time of 0.08ms, which is within the SSTV frame sync pulse. Thus we can display successive frames of SSTV, taken as snapshots at 7.68seconds apart. With the use of a line store the object must remain still in front of the camera for a full 3 seconds - as for a Victorian photograph!

**QUALITY CONTROL-** When a fast-scan signal is digitised it is essential that some form of monitoring is used to check that all 16 grey levels are being used in the conversion. Fig. 5 shows a circuit which can easily be added to a converter which uses a chain of 711s. The output of this circuit is fed to an oscilloscope which has its timebase set to display 3 fast-scan frames. The fast-scan line sync clocks a divide-by-3 circuit which closes three electronic switches in rapid succession. Thus, on the screen of the CRO we see a sequence of 1 line of white level, 1 line of black level and 1 line of video, which is repeated across the screen. This gives the appearance of a steady line at the white level, a similar line at the black level, and the varying video signal in between. The white and black level controls are then adjusted so that the video waveform lies between them. If the white level is too low or the black level too high, then clipping will occur and this can be seen on the SSTV display as large areas of white, or black, with very little detail in them. Note that some digitisers use "contrast" and "brightness" controls rather than the white and black level controls referred to; the principle of setting the video between the two levels remains the same.

Whilst on the subject of picture quality, it is worth doing some trials with a series of different pictures as it appears that some pictures are more suitable than others for the SSTV system. Experiment with a critical eye on the SSTV screen and you will soon find out the type of picture the SSTV system likes best.

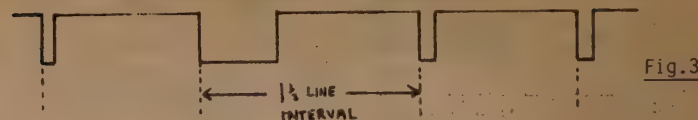


Fig.3

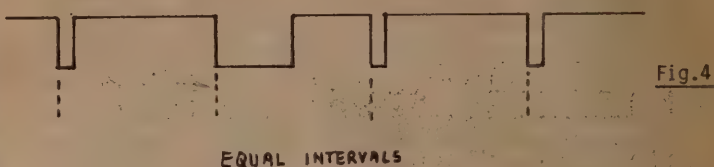


Fig.4

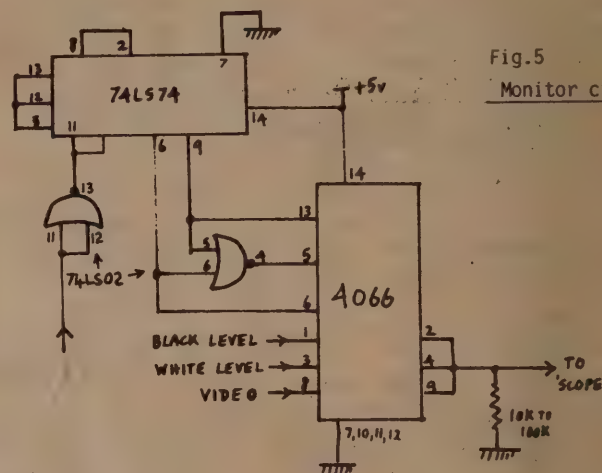


Fig.5  
Monitor circuit

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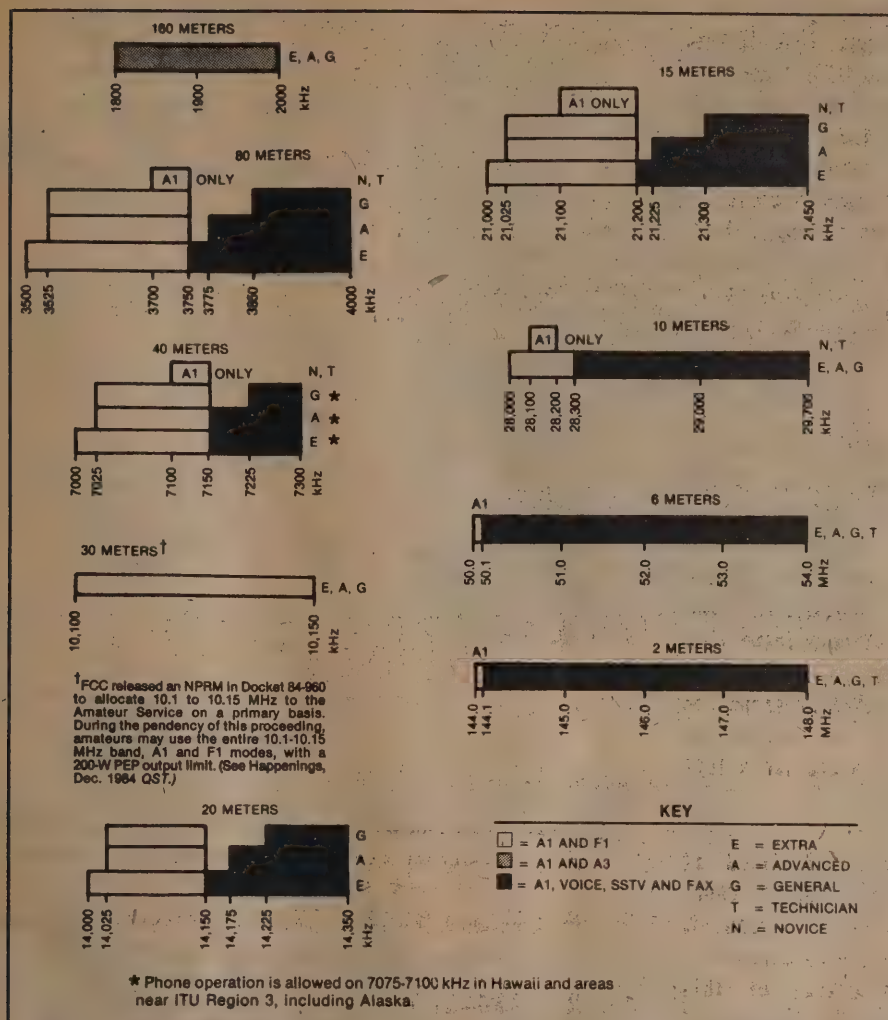
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# U.S. Amateur Frequency and Mode Allocations

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"24.935 RECOMMENDED FOR NEW SSTV CALLING FREQUENCY"



## The "Considerate Operator's Frequency Guide"

Some frequencies that are generally recognized for certain modes or certain activities (all frequencies are in MHz):

- 1.800-1.825 CW only
- 1.825-1.830 "DX window" (no W/VEs)
- 1.850-1.855 "DX window" (no W/VEs)
- 3.590 RTTY DX
- 3.610-3.630 RTTY
- 3.790-3.800 "DX window"
- 3.845 SSTV
- 7.040 RTTY DX
- 7.080-7.100 RTTY
- 7.171 SSTV
- 10.140-10.150 RTTY
- 14.080-14.100 RTTY
- 14.100 NCDXF beacon
- 14.230 SSTV
- 14.313 Maritime mobile
- 21.080-21.100 RTTY
- 21.340 SSTV
- 28.080-28.100 RTTY
- 28.200-28.300 Beacons
- 28.680 SSTV
- 29.300-29.500 Satellite downlinks
- 29.520-29.580 Repeater inputs
- 29.600 FM simplex
- 29.620-29.680 Repeater outputs

ARRL band plans for bands above 29.300 MHz are shown in the ARRL Repeater Directory. FCC PR Docket No. 84-960 proposes to allocate the 24.890-24.990 MHz band to General, Advanced and Extra Class licensees, with A1 and F1 emissions permitted on 24.890-24.930 MHz and A1, A3, A4, A5, F3, F4 and F5 emissions on 24.930-24.990 MHz. Amateur usage is expected to be as follows:

- 24.890-24.920 — CW
- 24.920-24.930 — RTTY
- 24.930-24.990 — phone, SSTV, FAX.

Amateur's are very close to getting some new operating frequency privileges thanks to the results of the recent FCC PR Docket 84-960. One of the new HF operating areas is on 24 Mhz. Many HF equipment builders have already been changing their designs to include the new positions on the band switch. Others will have to "modify" their gear to work there. It is anticipated, that this new bands' propagation characteristics will be similar to that of the nearby 21 Mhz. 15 Meter band. The 24 Mhz. area lies between the 15 and 10 Meter Amateur HF bands. It should be a very interesting location to view good quality (low power) SSTV pictures.

## Use It Or Lose It!

We are in a very critical period of time as the population begins to settle this new Amateur band. In cooperation with The ARRL, the above 24 Mhz. bandplan is published above. The USATVS "Frequency and Mode Protection Committee" has been studying this guide and we anticipate no problems in its' endorsement. As yet, no other SSTV publication or organization has "taken the lead" in coordinating new recommended operating areas. The League recommends that from 24.890 to 24.920 be used exclusively for CW, 24.920 to 24.930 for RTTY and 24.930 to 24.990 for Phone, SSTV and FAX. We would like to suggest that SSTV'ers (upon official approved operating dates) immediately populate "AND BEGIN USING" the bottom end of this new phone area for SSTV pictures and voice transmissions. The area between 24.930 and 24.940 should be used heavily for SSTV and FAX transmission (24.940 FAX). 24.935 Mhz. appears to be an ideal SSTV CB calling AND OPERATING frequency to settle on. It allows a 5 KC bottom band edge protection that most non-SSTV'ers probably won't want to get close to. As groups begin to settle in on their chose frequency spots, the stage will soon be set for successful SSTV area establishment. The lack of a "unified" effort is certain to result in chaos and years or non-SSTV conflicts. The new 24 Mhz. band will alleviate the stressful SSTV load now being felt on 14.230 Mhz. with a very erratic 28.680 Mhz. 10 Meter band in the bottom of the 11 year sunspot cycle. Since the expansion of General, Advanced and Extra Phone privileges on 20 Meters, other than a crude attempt by a few individuals to populate an "exclusive" lower Advanced/Extra SSTV operating area (which failed), 14.230 Mhz. remains on solid ground as the best recognized HF SSTV calling frequency area. The new 24 Mhz. band needs to be discussed on HF SSTV Nets and QSO's to "spread the word".



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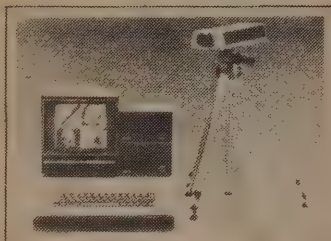
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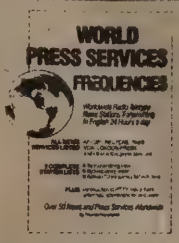
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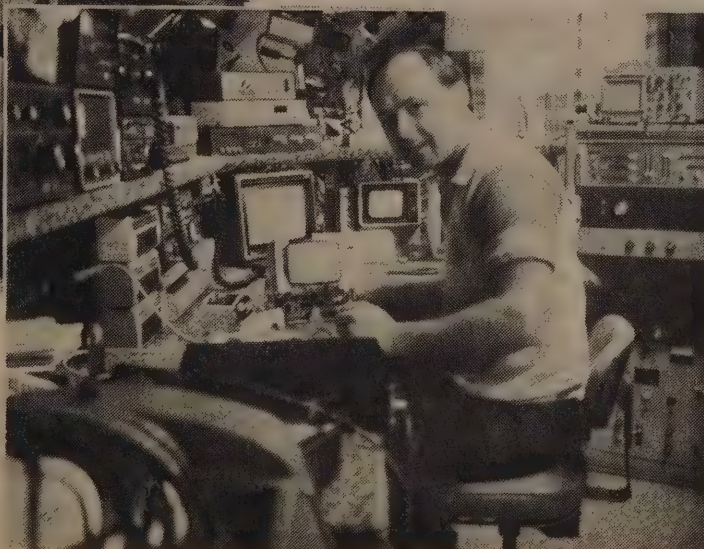
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### "AS" SHACK OF THE MONTH!

Tracy's picture was shown in our last issue as Chief Technician of the QUAD-CITIES N9CAI/R ATV FSTV Repeater System. Here is his "ATV SHACK" setup at his Rock River home in Moline, Ill. He is working on hooking up 12 vdc. to a \$38.00 B/W monitor TV to be used at the N9CAI/R site. He is active on FSTV, SSTV and has his own rooftop antenna SATELLITE TVRO system. He loves ATV Special Effects (see

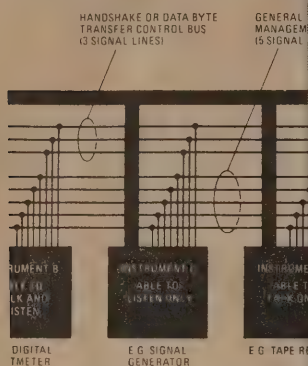
19" rack mounted generator also on channel 8. Equipment includes PC TC-1, several VCR's, RAMSEY 601-scope, K9KKL 100 watt UHF-TV Amp, Kenwood HF gear, Commodore 64 Computer System, 28 Teletype KSR and lots more! Tracy's best ATV-DX is over 200 miles to Dave Williams WB0ZJP in St. Louis, Missouri in the fall of 1984.



the  
weekender

noise cancellation circuit

As an LF enthusiast, I've often en-  
countered the problem of 160 to 190 kHz (1750 m)  
interference.



Use a cable to quickly link any instruments equipped with a digital interface to a computer. The cable can be used for serial, bit-parallel at rates as high as 1 megabit per second.

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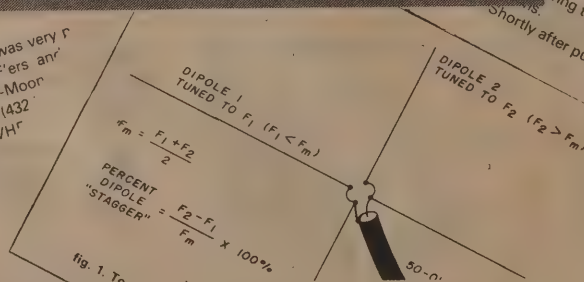
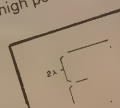
F antennas and  
systems

is probably no other  
topic that inspires such a  
line of conversation than the  
of antennas. Hardly a day  
y when I'm not asked ques-  
ke "What type of antenna do  
recommend?" or "What's the  
between this antenna and  
one?" The reason we're so inter-  
ested is that there is no  
the perform-

vastly in form  
each type indi-  
each can and do

collinear array

The collinear array was very  
lar among VHF/UHF's and  
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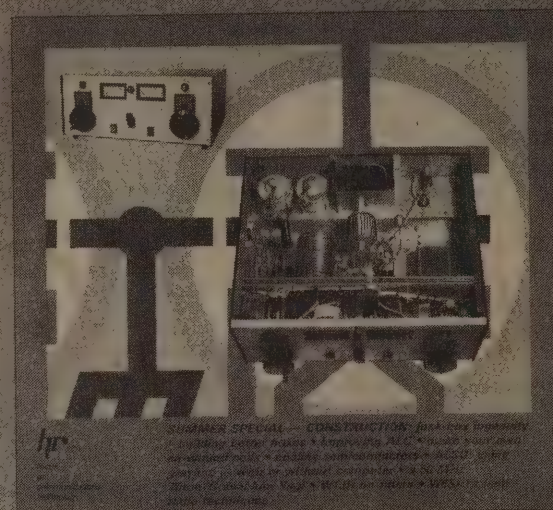
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SUMMER SPECIAL — CONSTRUCTION — Part 1: Building a portable VHF/UHF antenna. Part 2: Building a portable VHF/UHF antenna. Part 3: Building a portable VHF/UHF antenna.



The VFO dial calibration problem is a matter of fine tuning the VFO and HFO in accordance with the procedure described here. The Heathkit procedure does not calibrate the frequency of the HFO; it also does not switch in the offset capacitor (C55) during VFO calibration so that the dial reads transmit frequency.

modification procedure

Remove the following resistors:  
R82, R84, R85, R87, R88,

to  
le  
pu  
C52

ham radio  
TECHNIQUE

the output power of the final amplifier stages at high values of SWR. One of the antennas I discussed was the crossed-dipole array described by Mason Logan, K4MT, in the May, 1983, issue of this magazine. His basic antenna design is shown in fig. 1. The measured SWR curve of this antenna is shown in fig. 2. I suggested in my column that a matching coil be required at the antenna feed, bringing the impedance closer to 50 ohms. Shortly after publication, I received



# AMATEURS GATHER FOR THE WINTER AT QUARTZSITE, ARIZONA AND "RABCHEWI"

by Leo Roberts K9D6X

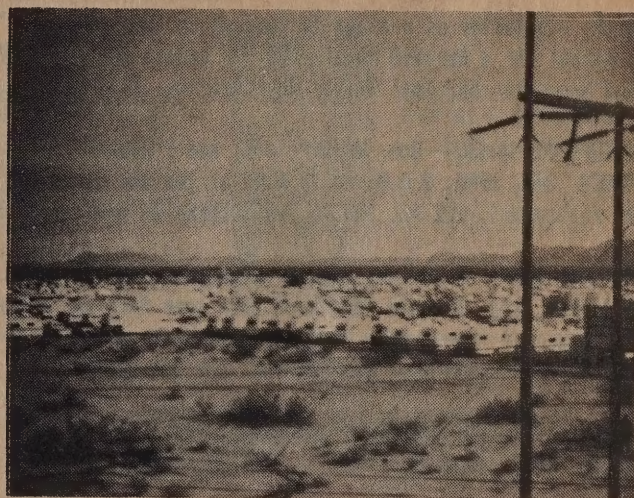
## PREFACE

While eating a batch of my homecooked "sourdough" hotcakes at the September Peoria, ILL. Superfest, WB0QCD and I were discussing the phenomenal happening that takes place each winter at Quartzsite, Arizona. Since Mike's mom and dad have also taken part in this extravaganza-he was well familiar with it all. Mike asked for an article on HAM RADIO activity there and here is my accounting.

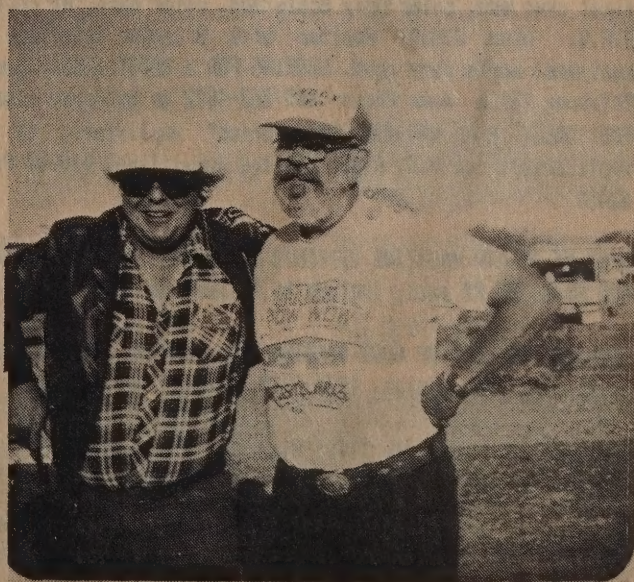
## Home Of The SNOWBIRDS

"You'll just have to go to Quartzsite". Many times we heard that statement from other campers as we toured the West and Northwest. So we did, and the first year was an initiation and by the next year we were well into the routine of helping our fellow travelers enjoy this unique happening. But I'm a little ahead of my story. Quartzsite, Arizona is a sleepy- near ghost town- nestled in the Plomosa Valley of Southwest Arizona on Interstate 10 and about twenty miles East of Blythe, California. Historically a stage stop and gold mining town it is now noted as a mecca for winter visitors trying to escape the cold and snow of the northern states. It is also known as the home of the Quartzsite Pow-Wow, an event billed as the worlds largest Gem and Mineral show. This, plus an average high of 73 degrees and average low of 44 degrees for the mid winter months, is an attraction for a tremendous amount of people. Some early arrivals come around the 1st of October. By December all the trailer courts are full and a desert area south of town known as the LaPaz Recreation area has a large population of those who like to live in the "Boondocks". This continues building until the first weekend in February and the Quartzsite Pow-Wow. There are other areas of "flea markets" and "Sell A Ramas" going on at the same time so this sleepy little town of about 850 permanent residents has swelled by this one hectic weekend to almost 1,000,000. Of these of course are a good representation of hams. The winter of 82-83, Mitch W0PVM saw the need for a service net and started the "Quartzsite Review" on 146.52 Simplex. The response was tremendous and proved to be a help in locating people who were wintering in the area. After the big weekend was over Mitch had to return to Denver and turned the net over to Leo K9D6X who finished out the year, closing the net down March 1st. The winter of 83-84 Leo K9D6X started up operations the 15th of December operating the net on Tuesdays and Thursdays using 142.52 simplex again. Liason was established with the Desert Waves net from Blythe, CA. using the Parker repeater on 146.25-.85 with Virg- W6GUP as net control. As the winter population increased more net coverage was needed and K9D6X started calling the net every nite in mid January. Earl W9JQX monitored the Kingman repeater on 146.16-76, Ruthe WA6ZVN assumed the same duties on the Parker repeater 146.25-.85 and Leo K9D6X watched 146.52 simplex. This gave full coverage of the valley and was a tremendous help to many travelers. Much credit goes also to Don W6ROP whose help with his TRS80 Computer kept track of the ever changing call list which peaked at 140 checkins.

Many of these hams gathered in an area off mile post 103 south of Quartzsite where on the peak weekend they gathered for a pot luck dinner. I want to mention Bruce VK3QC and his wife Muriel visiting here from Victoria, Australia. There may have been others from over seas but no record of that. The east coast was represented by Mark KA4KLS from North Carolina. In all there were 15 states plus Hawaii, Alaska and Canada represented. The net continued until the 1st of March when all those leaving gathered at a local restaurant for the "Die Hards Dinner". So if you are looking for a change of pace this winter come to Quartzsite. There is plenty of things to do. The area is a rockhound's paradise- there is a very active club and a well equipped shop. Saturday nite dances with all visiting musicians, in fact almost anything you can think of goes on- all home brew. So if it isn't here now- start it. If you come be sure to monitor the frequencies mentioned, especially 146.52 when you arrive. Also Blythe, CA. has a machine on 147.09-69 and Yuma, AZ. is readable in some areas on 146.28-.88. So come on, down and join the fun. 73's Leo K9D6X



Upper - Just a few of the thousands of trailers that campout the winter at Quartzsite, AZ. Lower - Don W6ROP and Leo K9D6X "Chum-it-up" during last seasons gathering.





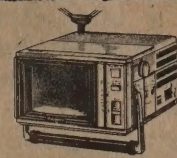
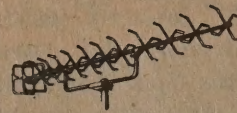
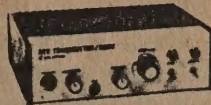
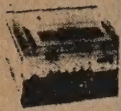
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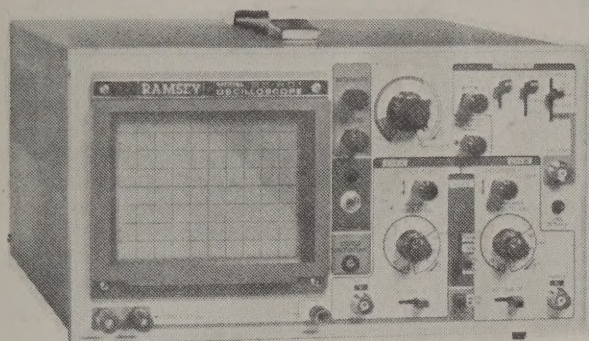
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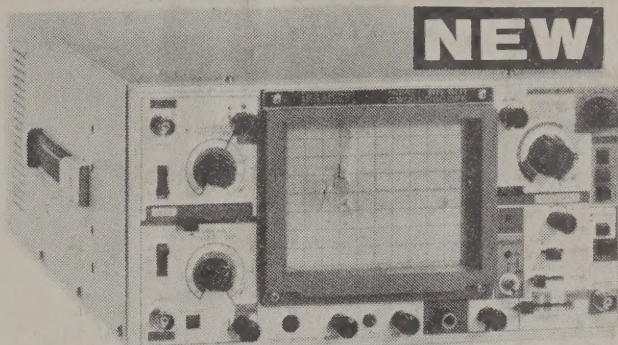
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(See "A5" Review in July 84 Vol. 14 No.7 Issue)



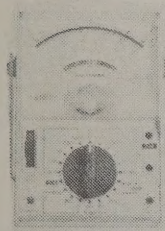
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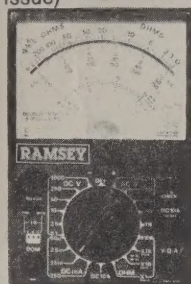
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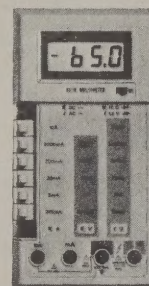
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BP-4 nicad pack ..... 8.95



## CT-90 9 DIGIT 600 MHz COUNTER

The most versatile for less than \$300. Features 3 selectable gate times • 9 digits • gate indicator • display hold • 25mV @ 150 MHz typical sensitivity • 10 MHz timebase for WWV calibration • 1 ppm accuracy

**\$14995** wired includes AC adapter

CT-90 kit ..... \$129.95  
OV-1 0.1 PPM oven timebase ..... 59.95  
BP-4 nicad pack ..... 8.95

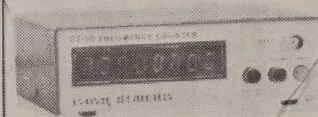


## CT-125 9 DIGIT 1.2 GHz COUNTER

A 9 digit counter that will outperform units costing hundreds more. • gate indicator • 24mV @ 150 MHz typical sensitivity • 9 digit display • 1 ppm accuracy • display hold • dual inputs with preamps

**\$16995** wired includes AC adapter

BP-4 nicad pack ..... 8.95

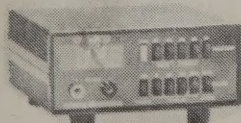


## CT-50 8 DIGIT 600 MHz COUNTER

A versatile lab bench counter with optional receive frequency adapter, which turns the CT-50 into a digital readout for most any receiver • 25 mV @ 150 MHz typical sensitivity • 8 digit display • 1 ppm accuracy

**\$16995** wired

CT-50 kit ..... \$139.95  
RA-1 receiver adapter kit ..... 14.95



## DM-700 DIGITAL MULTIMETER

Professional quality at a hobbyist price. Features include 26 different ranges and 5 functions • 3 1/2 digit, 1/2 inch LED display • automatic decimal placement • automatic polarity

**\$11995** wired includes AC adapter

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MP-1 probe set ..... 4.95

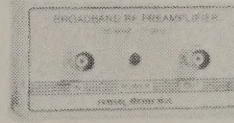


## PS-2 AUDIO MULTIPLIER

The PS-2 is handy for high resolution audio resolution measurements, multiplies UP in frequency • great for PL tone measurements • multiplies by 10 or 100 • 0.01 Hz resolution & built-in signal preamp/conditioner

**\$4995** wired

PS-2 kit ..... \$39.95

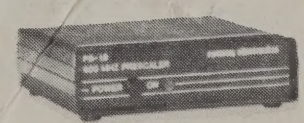


## PR-2 COUNTER PREAMP

The PR-2 is ideal for measuring weak signals from 10 to 1,000 MHz • flat 25 db gain • BNC connectors • great for shifting RF • ideal receiver/TV preamp

**\$4495** wired includes AC adapter

PR-2 kit ..... \$34.95



## PS-1B 600 MHz PRESCALER

Extends the range of your present counter to 600 MHz • 2 stage preamp • divide by 10 circuitry • sensitivity: 25mV @ 150 MHz • BNC connectors • drives any counter

**\$5995** wired includes AC adapter

PS-1B kit ..... \$49.95

## ACCESSORIES FOR RAMSEY COUNTERS

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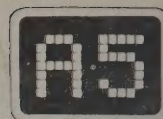
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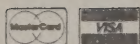
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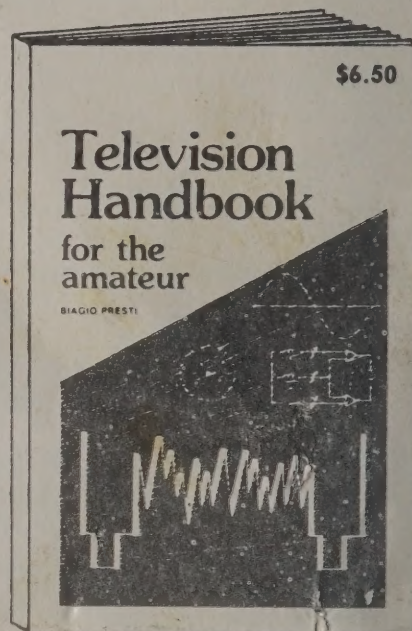
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